This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

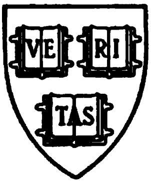
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`



HARVARD LAW SCHOOL
LIBRARY

499

May 14

THE

QUARTERLY JOURNAL

OF

ECONOMICS

VOLUME XXXVI

1921-22

CAMBRIDGE, MASS., U.S.A.
PUBLISHED BY THE HARVARD UNIVERSITY PRESS
1922

HB
1
.Q3
v.36

PRINTED AT THE HARVARD UNIVERSITY PRESS

CONTENTS FOR VOLUME XXXVI

Writers

PAGE
Angell, J. W. International Trade Under Inconvertible Paper 359
Arner, G. B. L. Land Values in New York City 545
Bezanson, Anna. Promotion from Without. *Note* 154
—— The Early Use of the Term Industrial Revolution. *Note* . 343
—— Skill 626
Brown, H. G. Sharfman's American Railroad Problem. *Review* 323
Cole, A. H. The Domestic and Foreign Wool Manufactures and the Tariff Problem 102
Cooke, T. The Nebraska Deposit Guaranty Fund. *Note* 162
Cunningham, W. J. The Railroads Under Government Operation. II. From January 1, 1919 to March 1, 1920 30
Davis, J. S. Charles Rist on Germany's War Finances. *Review* 136
—— Index Numbers of Foreign Exchange. *Note* 535
Dewing, A. S. A Statistical Test of the Success of Consolidations 84
Doane, W. F. Cole's "The Domestic and Foreign Wool Manufactures and the Tariff Problem." *Review* 504
Durand, E. D. Agriculture in Eastern Europe 169
Friday, David. An Extension of Value Theory 197
Graham, F. D. International Trade Under Depreciated Paper. The United States, 1862–79 220
Hamilton, W. H. A Theory of the Rate of Wages 581
Hansen, A. H. The Technological Interpretation of History. . . 72
Hibbard, B. H. The Intensity of Cultivation 646
Knight, F. H. Cassel's Theoretische Sozialökonomie. *Review* . . 145
—— Ethics and the Economic Interpretation 454
Kotany, Louis. A Theory of Profit and Interest 413
Liefmann, Robert. The Chief Problem of Economic Theory. *Note* 335
McDougall, W. Stoddard's The Revolt against Civilization—The Menace of the Underman; Desmond's Labour, the Giant with the Feet of Clay. *Review*. 666
Moore, H. L. The Origin of the Eight-Year Generating Cycle . . 1
Orchard, J. E. The Rent of Mineral Lands 290
Preston, H. H. A Crisis in Deposit Guaranty in the State of Washington. *Note* 350
Schwiedland, E. P. Damiris' The Monetary System of Greece. *Review*. 319
Sharfman, I. L. The American Railroad Problem: A Reply. *Note* 705
Usher, A. P. The Genesis of Modern Capitalism. *Review* 525
Vaile, Roland. Some Effects on Certain Agricultural Products of Uniform Percentage Increases in Freight Rates. *Note* . . 718
Warne, C. E. Enforced Par Remittance Under the Federal Reserve System 274
Watkins, G. P. Knight's Risk, Uncertainty and Profit. *Review* 682
Williams, J. H. German Foreign Trade and the Reparation Payments 482
Wright, P. G. Moore's Work in Cycles: A Review. *Note* . . 691

SUBJECTS

PAG

Agriculture in Eastern Europe. By E. D. Durand 166
American Railroad Problem, The: A Reply. *Note.* By I. L. Sharfman 705
Cassel's Theoretische Sozialökonomie. *Review.* By F. H. Knight 145
Charles Rist on Germany's War Finances. *Review.* By J. S. Davis 136
Chief Problem of Economic Theory, The. *Note.* By Robert Liefmann 335
Cole's "The Domestic and Foreign Wool Manufactures and the Tariff Problem." *Review.* By W. F. Doane 504
Crisis in Deposit Guaranty in the State of Washington, A. *Note.* By H. H. Preston 350
Damiris' The Monetary System of Greece. *Review.* By E. P. Schwiedland 319
Domestic and Foreign Wool Manufactures and the Tariff Problem, The. By A. H. Cole 102
Early Use of the Term Industrial Revolution, The. *Note.* By Anna Bezanson 343
Enforced Par Remittance Under the Federal Reserve System. By C. E. Warne 274
Ethics and the Economic Interpretation. By F. H. Knight . . 454
Extension of Value Theory, An. By David Friday 197
German Foreign Trade and the Reparation Payments. By J. H. Williams 482
Index Numbers of Foreign Exchange. *Note.* By J. S. Davis . . 535
Intensity of Cultivation, The. By B. H. Hibbard 646
International Trade Under Depreciated Paper. The United States, 1862–79. By F. D. Graham 220
International Trade Under Inconvertible Paper. By J. W. Angell 359
Knight's Risk, Uncertainty and Profit. *Review.* By G. P. Watkins 682
Land Values in New York City. By G. B. L. Arner 545
Moore's Work in Cycles: A Review. *Note.* By P. G. Wright . 691
Nebraska Deposit Guaranty Fund, The. *Note.* By Thornton Cooke 162
Origin of the Eight-Year Generating Cycle, The. By H. L. Moore 1
Promotion from Without. *Note.* By Anna Bezanson 154
Railroads Under Government Operation, The. II. From January 1, 1919 to March 1, 1920. By W. J. Cunningham 30
Rent of Mineral Lands, The. By J. E. Orchard 290
Sharfman's American Railroad Problem. *Review.* By H. G. Brown 323
Skill. By Anna Bezanson 626
Sombart's "The Genesis of Modern Capitalism." *Review.* By A. P. Usher 525
Some Effects on Certain Agricultural Products of Uniform Percentage Increases in Freight Rates. *Note.* By Roland Vaile 718
Statistical Test of the Success of Consolidations, A. By A. S. Dewing 84
Stoddard's The Revolt against Civilization—The Menace of the Underman; Desmond's Labour, the Giant with the Feet of Clay. *Review.* By W. McDougall 666
Technological Interpretation of History, The. By A. H. Hansen 72
Theory of Profit and Interest, A. By Louis Kotany. 413
Theory of the Rate of Wages, A. By W. H. Hamilton. 581

Nov. 1921
1, 3, 4
36 II 1
PROPERTY OF
FEB 27 1956
HARVARD LAW LIBRARY

THE
QUARTERLY JOURNAL
OF
ECONOMICS

NOVEMBER, 1921

THE ORIGIN OF THE EIGHT-YEAR GENERATING CYCLE

SUMMARY

The persistence of the eight-year generating cycle in England for one hundred and sixty years; the congruence of the eight-year crop cycles in England, France, and the United States; the persistence of the eight-year meteorological cycles, and their congruence in Europe and America; the congruence of the economic and meteorological cycles — these uniformities and agreements suggest that their cause must be sought in a cosmical cycle. The probable cause is the planet Venus in its eight-yearly periodic motion with respect to the Earth and the Sun.

I. Economic cycles, 2. — II. Meteorological cycles, 8. — III. The cause of the eight-year generating cycle, 18.

Generating economic cycles are to be described as economic cycles that have their origin in non-economic causes and become the originating source of derived economic cycles. The theory of generating cycles embraces three fundamental inquiries: first, as to the existence of generating cycles, their length, amplitudes and phases; second, as to the ways in which the generating cycles work out their rhythmic effects in remote phases of economic life; and third, as to the cause of generating cycles. In other essays I have dealt with the first and second of these divisions. The present paper attempts to place the cause of the eight-year generating cycle.

I. Economic Cycles

If index numbers of the annual yield per acre of American crops are plotted for a considerable period, from 1882 to the present time, for example, the graph will be a composite of three types of changes — secular, cyclical, and random — which were long ago classified and described by Cournot. In a recent article in this Journal [1] I eliminated the secular changes in the yield per acre of the six leading crops in American agriculture, and then formed index numbers of their percentage deviations from the respective secular trends. The series of index numbers was then scrutinized with a view to finding evidence of a real, recurring cycle, and Figure 1 shows that of all possible cycles between three and twelve years in the index numbers of the yield per acre of the crops, the most probable length is in the neighborhood of eight years. If an eight-year cycle is fitted, by the method of least squares, to the index numbers of yield, the maxima of the repeated cycle fall, approximately, at 1882, 1890, 1898, 1906, 1914. In other

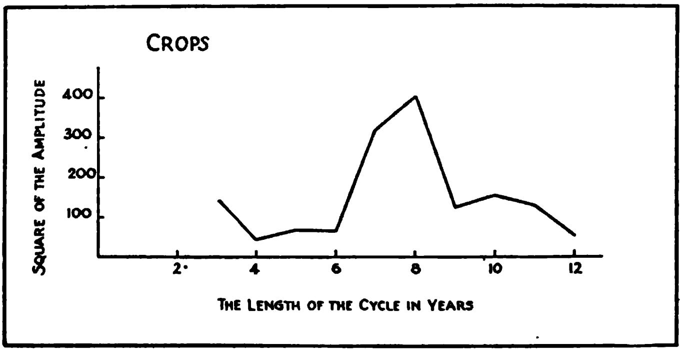


Figure 1. Periodograph of the yield per acre of American crops.

---

[1] "Generating Cycles of Products and Prices," February, 1921.

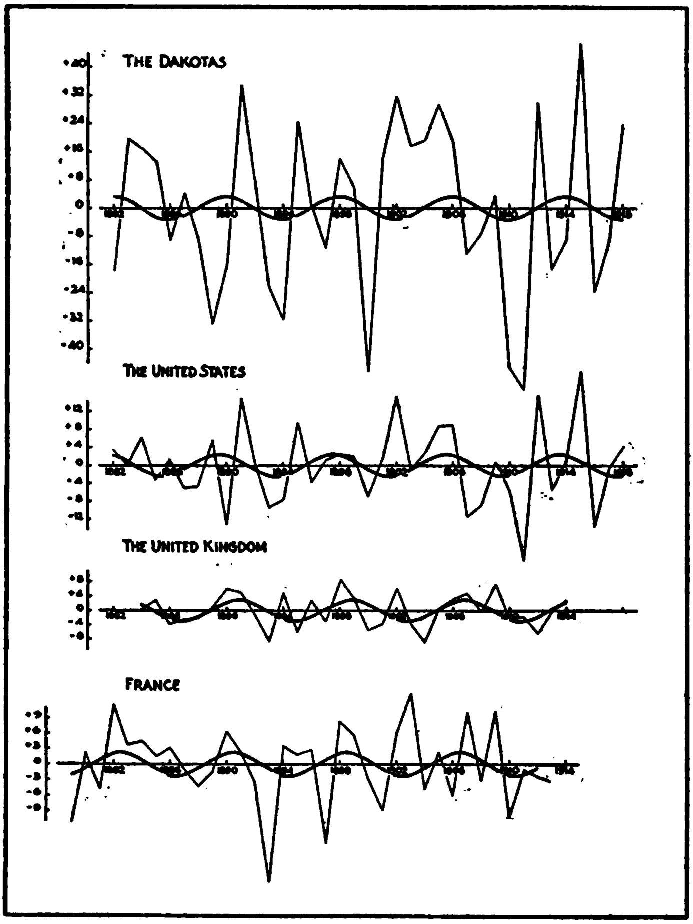


FIGURE 2. Cycles in the yield of wheat, oats, and barley in the Dakotas, the United States, the United Kingdom, and France.

The Dakotas: $y = 3.20 \sin \left(\frac{360^\circ}{8} t + 93^\circ\ 9'\right)$, origin at 1882;
The United States: $y = 2.49 \sin \left(\frac{360^\circ}{8} t + 111^\circ\ 27'\right)$, origin at 1882;
The United Kingdom: $y = 3.02 \sin \left(\frac{360^\circ}{8} t + 142^\circ\ 0'\right)$, origin at 1884;
France: $y = 2.17 \sin \left(\frac{360^\circ}{8} t + 292^\circ\ 56'\right)$, origin at 1879.

studies[2] referring to the Dakotas, the United States, the United Kingdom, and France, the eight-year cycles were isolated and were found to be practically synchronous in these countries. Figure 2 shows the graph descriptive of the eight-year cycles in the yield of wheat, oats, and barley.

With the existence of an international cycle in the yield of the crops firmly established, an obvious corollary suggested that according to the law of demand — in consequence of which the price tends to fall with an increase in the supply of the commodity — there should be a derived eight-year cycle in the prices of farm products. Accordingly, the law of demand for the six representative American crops was ascertained, and the derived cycle of prices of farm products was computed from the established eight-year cycles in the yield of the crops. The results are presented in Figure 3, together with a comparison between the actual index numbers of prices and the forecast indices of prices.[3]

After ascertaining that the prices of agricultural products do actually vary inversely with the yield in a definite, predictable way, it became possible to subject the theory of the existence of generating cycles of crops to a severe critical test. If the prices of agricultural commodities do vary inversely with the yield, and if there is a real cycle of eight years in the yield of the crops, then the record of prices throughout a long interval should reveal the existence of the eight-year generating cycle of crops. Moreover, if the generating cycle is a persistent, real cycle, then the cycle of yield per acre that is revealed indirectly by the record of prices

---

[2] "Crop-Cycles in the United Kingdom and in the United States," Journal of the Royal Statistical Society, May, 1919; "Crop-Cycles in the United Kingdom and in France," ibid., May, 1920; "Forecasting the Crops of the Dakotas," Political Science Quarterly, June, 1920, particularly pp. 228, 229.

[3] Figure 3 is taken from "Generating Cycles of Products and Prices," in this Journal, February, 1921, p. 227.

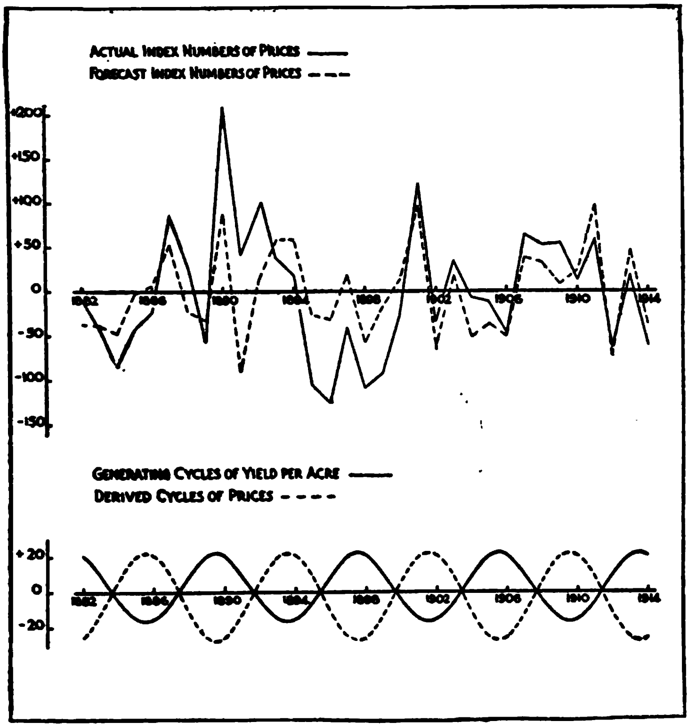


FIGURE 3.

Upper part: Actual index numbers of prices of the six representative crops and the index numbers of prices forecast from the index numbers of the yield per acre by means of the formula $y = -1.295x - .02.$

Lower part: Generating cycles of the yield per acre of the crops, $y = 1.6 + 20.0 \sin (45°t + 109°)$, origin at 1882; Derived cycles of prices of the crops computed from the generating cycles of yield by means of the formula, $y = -1.295x - .02.$

throughout a long interval should be the same as the cycle that is obtained directly from the more recent official estimates of the actual yield per acre. Figure 4 shows not only that the record of prices in England from 1760 to 1875 exhibits a clear-cut cycle of eight years in the yield per acre,[3a] but also that the cycle is

[3a] Figure 4 is taken from "Generating Cycles Reflected in a Century of Prices," in this Journal, August, 1921, p. 520.

continuous with the eight-year cycle which is established directly from the official estimates of the crop yields since 1884.

The theory of the generating cycle also requires that the movement of general prices should follow the rhythmic changes in the yield of agricultural products. As nearly all foods are derived either directly or indirectly from the farms, and as eighty per cent of the raw materials of manufactures — according to the United States census of 1900 — are organic raw materials produced on the farms, the movement of general prices should reflect the rhythm in the yield of the crops. Here it became possible to subject the theory of the relation between the generating cycles of crops and the movement of general prices to a searching empirical test. Sauerbeck's index numbers of general prices, covering the interval of nearly a century between the Napoleonic wars and the Great War, were examined by means of Fourier analysis with a view to discovering real periodicities. The analysis showed that if there were a sequence of real cycles in the century of prices in England, the most probable length of the constituent cycle was approximately eight years. When this cycle of general prices was computed and plotted, its graph was found to be practically congruent with the graph of the yield of wheat which was determined indirectly from the record of wheat prices from 1760 to 1875, and practically congruent with the graph of the cycles in the yield of the crops which was determined directly from the official estimates of the annual yield of the crops since 1884. The graphs are given in Figure 4.

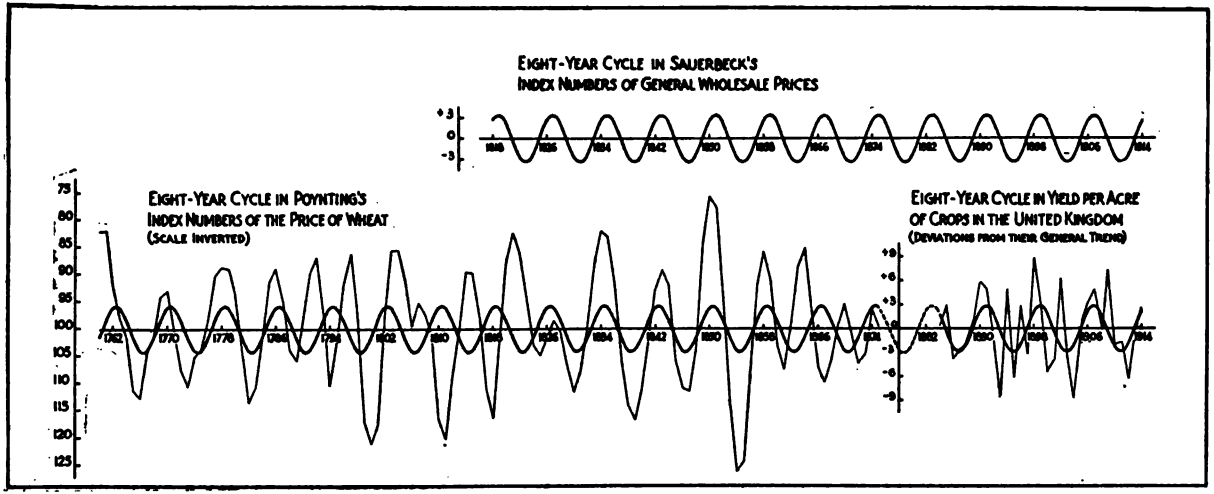


FIGURE 4. Generating cycles reflected in a century of prices.
Upper curve: $y = 3.5 \sin (\frac{360}{8}°t + 51°)$, origin at 1818. Derived from the 8.73 and 7.38 years Fourier constituents of Sauerbeck's index numbers.
Lower curves: Poynting's index numbers, $y = 100.2 + 4.4 \sin (\frac{360}{8}°t + 248°)$, origin at 1762;
Yield per acre of the crops, $y = 3.0 \sin (\frac{360}{8}°t + 142°)$, origin at 1884.

II. METEOROLOGICAL CYCLES

In 1919 the Carnegie Institution published *Climatic Cycles and Tree-Growth,* by A. E. Douglass. With the hope of throwing some light on the periodic activity of the sun, Professor Douglass, by training and profession an astronomer, undertook this laborious and valuable investigation of the variation in the size of the rings of trees, which, he assumed, was a consequence of meteorological changes having their origin in solar activity. He selected for his first studies yellow pines taken from the forests of northern Arizona. As there is, for the most part, a scant and variable rainfall throughout the state, Professor Douglass assumed as a working theory (1) that the growth of pines in that region depends largely upon the available water; (2) that the rings of the pines measure the growth of the trees; (3) that the rings form a measure of annual precipitation.

The rainfall of Arizona is extremely variable from station to station. "Storms come from the Pacific coast and rain occurs a day or so later than in southern California. Spring and autumn are the dry seasons, and the warmest time of the year is usually in June, just before the summer rains begin. The summer rains occur in July and August and often come in 'spells' that last a week or two, with thunderstorms in the afternoons or at night, followed by clear mornings. Unlike the winter storms, the summer rains are local and apt to be torrential in character, with heavy run-off." The San Francisco Peaks, ten miles north of Flagstaff, "illustrate how meteorological data may vary in rugged localities. The west slopes of these mountains are exposed to the westerly storms and have an immense snowfall. Springs abound, and all favorable localities are taken up as ranches. East of the mountain, however, the land is dry and barren, and long distances intervene between watering places. . . . In a very rugged country like that about Prescott similar differences between east and west mountain slopes must constantly occur."

The longest meteorological record in the Arizona pine forest was begun at Whipple Barracks, near Prescott, in 1867, and then continued at Prescott, which has an elevation of about 5200 feet. With the variability of rainfall from station to station which we have just noted, and with the change of the meteorological observation from Whipple Barracks to Prescott, one would scarcely expect any normality to be revealed in this particular rainfall record. An examination of Figure 5 is, nevertheless, surprisingly suggestive. The top graph[4] shows the relation between the annual rainfall and the

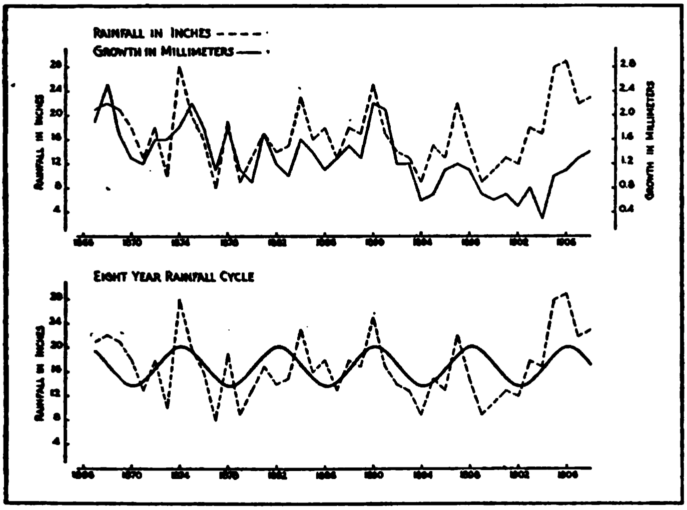


FIGURE 5. Cycles in the rainfall and in the growth of pines near Prescott, Arizona. Equation to the rainfall cycle, $y = 16.9 + 3.2 \sin (\frac{360^\circ}{8} t + 127^\circ\ 12')$, origin at 1867.

---

[4] The top graph is taken from Professor Douglass' work, p. 29.

growth of pines near Prescott. The growth seems to show a secular trend downwards and for that reason, in seeking the degree of relation between the annual rainfall and the annual growth, I have computed the correlation between their first differences. The measure of this relation is $r = .56$, which shows that there is an unmistakable relation between the rainfall and the growth of pines in this region.

Is the rainfall itself subject to law? In the lower part of Figure 5 an eight-year cycle is fitted to the annual rainfall data, and we find that the maxima occur at 1866, 1874, 1882, 1890, 1898, 1906 — which makes the Prescott rainfall, during this interval, synchronous with the crop cycles in the United States, in the United Kingdom, and in France. Gratifying as this result is, I should not attach importance to it — because of the meteorological record being made up of observations at two different stations in a country in which the rainfall is notoriously variable from station to station — but for its relation to what is about to be described.

Flagstaff, in Arizona, is about 67 miles north of Prescott. From the magnificent pine forests about Flagstaff Professor Douglass was able to obtain cuttings from trees which supplied him with a continuous history of rings for 500 years. Referring to these Flagstaff pines, Professor Douglass makes these statements as to the cyclical variations in their growth: "The interval from 1830 to the present time divides . . . fairly well in (a period) of 7.3 years" (p. 108). As to the whole record of 500 years, he says, "a 7-year period is also frequently observed" (p. 101). In Table 8 (p. 108) Professor Douglass indicates that this cycle of approximately 7.3 years has been continuous since 1817. By an odd coincidence Sauerbeck's index numbers of general prices in England begin just one year later, in 1818.

In the analysis of the Sauerbeck numbers we found[4a] that the eight-year cycle was the mean of two cycles, one of about 8.7 and the other of about 7.38 years. In Figure 6 the smooth graph records the 7.38-year cycle in Sauerbeck's index numbers, and the dashed graph,[5] the

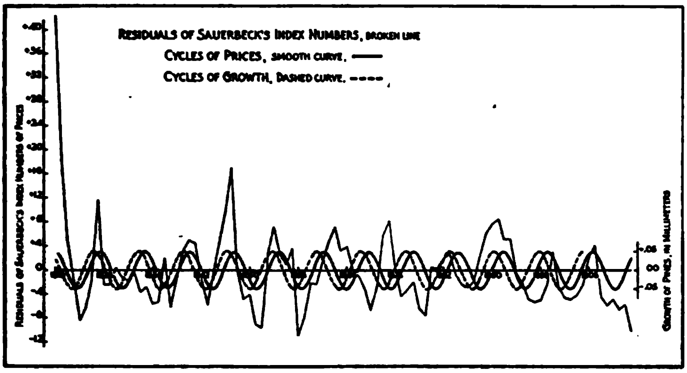


FIGURE 6. Cycles in the residuals of Sauerbeck's index numbers of general wholesale prices in England and in the growth of pines near Flagstaff, Arizona.
Equation to the cycle of prices, —— : $y = 3.1 \sin (\frac{360}{7.38}^{\circ} t + 92^{\circ})$, origin at 1818;
Equation to the cycle of growth, ······ : $y = .05 \sin (\frac{360}{7.33}^{\circ} t + 137^{\circ} 57')$, origin at 1818.

Douglass 7.3-year cycle in the Arizona pines. The two graphs, considering the errors in the estimated lengths of the cycles, are practically congruent, and from 1867 to 1910 the Douglass 7.3-year cycles in tree growth at Flagstaff run well with the eight-year cycles in the rainfall at Prescott.

The close relation between meteorological cycles and crop cycles is informingly illustrated in the crops of the spring-wheat area in the United States. In 1916, among the states of the United States, North Dakota ranked first in the production of spring wheat, second in the production of barley, and seventh in the production of oats; and to these three crops, in 1918, seventy per cent of its crop area was devoted. The semi-arid region of the United States begins to the west of the one-hundredth meridian, and this meridian divides nearly in two the state of North Dakota. The average precipitation does not greatly exceed the minimum that is essential for vegetation, and, consequently, we find a close correlation between the crop yield and the rainfall of the critical months, which are May and June. The correlation coefficients[6] between the rainfall of May and June and the yield of the crops are, for wheat, $r = .66$; for oats, $r = .79$; and for barley, $r = .73$.

[4a] "Generating Cycles Reflected in a Century of Prices," in this Journal, August, 1921.

[5] The data to which the cycle was fitted covered the 88 years from 1818 to 1905 and were taken from Professor Douglass' work, p. 113.

With this close relation between rainfall and crop yields established for this very important, semi-arid agricultural region, one is again led to inquire whether the rainfall itself is not subject to law.[7] The rainfall records of North Dakota and South Dakota, for May and June, from 1882 to 1918 were searched for evidence of periodicity between the limits of three and twelve years, and the result indicated that, if there is a real cycle of rainfall for May and June in these two representative states its most probable value is in the neighborhood of eight years. When an eight-year cycle is fitted to the rainfall data, the maxima occur, approximately, at 1882, 1890, 1898, 1906, 1914, and are practically synchronous with the dates of the maxima of rainfall of Prescott, Arizona, the growth of pines in Arizona, and the maxima of the international crop cycles in the United States, in the United Kingdom, and in France. The graph of the Dakota rainfall is given in Figure 7.

---

[6] "Forecasting the Crops of the Dakotas," Political Science Quarterly, June, 1920, p. 219.

[7] This question I have treated in a paper on "Forecasting the Crops of the Dakotas," Political Science Quarterly, June, 1920.

Starting from the hypothesis that American economic activity is largely dependent in its ebb and flow upon the prosperity of the agricultural Middle West, I sought, in an early study[8] of meteorological cycles, to discover a periodicity in the rainfall of the Mississippi Valley. As the meteorological records were much longer for the Ohio Valley than for the states further west, the rainfall of the Ohio Valley was made the basis of the first examination. The method employed was a test of the

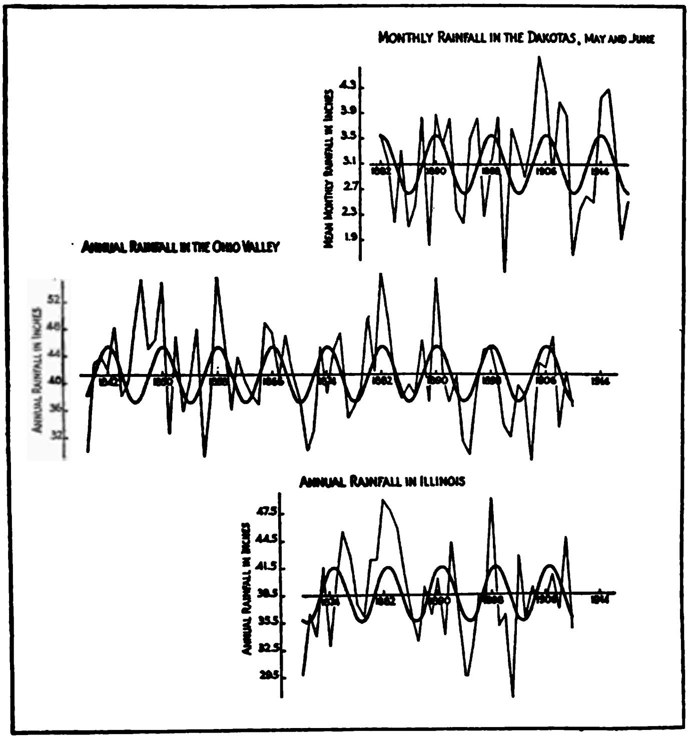


FIGURE 7. Cycles in the rainfall of the Dakotas, of the Ohio Valley, and of Illinois.
Dakota cycle: $y = 3.09 + 0.45 \sin (\frac{360^\circ}{8} t + 84^\circ\, 39')$, origin at 1882;
Ohio cycle: $y = 41.2 + 4.13 \sin (\frac{360^\circ}{8} t + 310^\circ\, 41')$, origin at 1839;
Illinois cycle: $y = 38.5 + 3.05 \sin (\frac{360^\circ}{8} t + 241^\circ\, 52')$, origin at 1870

---

[8] Economic Cycles: Their Law and Cause, 1914.

possible presence of cycles between the limits of three and thirty-three years, and the evidence was unmistakable. If there is a real cycle of rainfall in the Ohio Valley its most probable length is about eight years and its maxima are approximately synchronous with the maxima of the May and June rainfall of the Dakotas, the annual rainfall of Prescott, Arizona, the growth of pines in Arizona, and the international crop cycles to which we have so frequently referred. The graph is given in Figure 7.

At the time of the publication of the essay *Economic Cycles*, 1914, Illinois was regarded as our leading cereal-producing state, ranking first in the production of corn and second in the production of oats. Rainfall records for many stations in that state were available for a period of 41 years, from 1870 to 1910. The correlation between the rainfall in the Ohio Valley and the rainfall of Illinois was $r = .60$, and the eight-year cycle in the Ohio Valley rainfall was repeated in an eight-year cycle in the rainfall of Illinois. The graph is likewise given in Figure 7.

In October, 1920, H. W. Clough of the United States Weather Bureau published in the *Monthly Weather Review* an article on "An Approximate Seven-Year Period in Terrestrial Weather, with Solar Correlation." From this paper I make use of two facts: the first refers to atmospheric pressure at Toronto, in Canada, and at St. Louis, in the United States. In Mr. Clough's paper a graph is given of atmospheric pressure at Toronto from about 1843 to 1911, and a similar graph is given for the pressure at St. Louis from about 1874 to about 1917. An inspection of these shows (1) that for the interval covered by the two graphs, they are approximately congruent; (2) that the maxima occur, approximately at 1850, 1858, 1866, 1874, 1882, 1890, 1898, 1914, and are therefore synchronous with the economic and meteorological cycles already examined.

The other fact that I take from Mr. Clough's paper refers to atmospheric pressure in Europe. "Mauer (*Archives des Sci. Phys. Nat.*, Geneva, May, 1918) called attention to a well-marked periodicity of seven to eight years in the winter pressure in Central Europe, with maxima as follows: 1818–19, 1827–28, 1835–36, 1843–44, 1850–51, 1857–58, 1865–66, 1873–74, 1881–82, 1889–90, 1897–98, 1904–05, 1912–13."

If now the dates of the maxima in Mauer's European pressures are compared with Clough's in America, it will be seen (1) that they are approximately synchronous; (2) that the common interval between the maxima is about eight years; (3) that they are approximately synchronous with the maxima of the crop cycles in the United States, in the United Kingdom, and in France; (4) that they are approximately synchronous with the cycles in Sauerbeck's index numbers from 1818 to 1914.

The next evidence of meteorological cycles is found in an official publication by the United States Weather Bureau. In 1901 the United States took "the lead in reducing its barometric observations to a standard system."[9] The work was conducted by Professor F. H. Bigelow and included "a reëxamination of the various elevations, the local and instrumental errors, the reduction of the station pressures to a homogeneous system, and the preparation of normal tables and charts of pressure, temperature, and vapor pressure at sea level and at the 3,500 foot and 10,000 foot planes."[10] This

---

9. Prefatory note in vol. ii of Report of the Chief of the Weather Bureau, 1900, 1901.
10. Report of the Chief of the Weather Bureau, 1900–01, vol. i, p. 12.

monumental work bears the title *Report on the Barometry of the United States, Canada, and the West Indies*, and constitutes volume II of the *Report of the Chief of the United States Weather Bureau, 1900, 1901.*

After the completion of this Report with the reduced and standardized material, it became possible for the first time to combine the many thousands of observations that had been made in the United States since the beginning, in about 1870, of the systematic work of official weather observation. The tremendous importance of this great increase in the utilizable meteorological observations is shown in what is, I think, the most pregnant conclusion of Professor Bigelow's Report. I shall quote that conclusion at length and invite particular attention to a few sentences which I have put in italics. The table referred to in the quotation is one in which the final mean pressures for the whole of the United States and for the several constituent large sections are presented. In detail, the barometric pressure series upon which the generalization was based were obtained from the following sections: North Atlantic, South Atlantic, Lake Region, Pacific, West Gulf, North Plateau, South Plateau, and from the records of these regions all combined into a general mean. The pregnant quotation is now given:

> We are at once struck by the remarkable fact, which constitutes an *important discovery in barometric science*, that the secular variations of the barometer from year to year are by no means accidental but a phenomenon of definite proportions. In looking over the tables it is seen that for certain years the barometric reading is persistently lower than the average of the series, and for certain other years it remains higher than the average. This fact is indicated, generally, by each station in the group, most conspicuously for the year 1878. The residuals of that year are persistently minus, about −0.050 inch *for each station in every group for the entire United States;* for the year 1883 they are as persistently plus, about +0.020 inch. This constitutes a range of 0.070 inch, and when we consider that the

annual range in the barometer, due to the change of the sun in latitude from +23° to −23°, causing the change in the seasons, the difference between winter and summer, is shown by Table 54 to be about 0.100 inch, we conclude that *we are dealing with a phenomenon which at times is seven-tenths of the annual departure in its intensity.* The fact is that the barometric pressure is sometimes maintained higher than the average throughout the entire year over a large continental area in middle latitudes, and that it often equals at least half as much as the influences of the sun's action on the atmosphere by departing 23 degrees in latitude from the equator; in other years the pressure is kept lower than the average by a similar amount. *The years of maximum pressure are 1874–75, 1882–3, 1890, 1896–7, with an interval of about 8 years between them successively; the years of minimum pressure are 1878, 1884–5, 1893, also having an interval of about 8 years. . . .*"

In seeking for the causes of this phenomenon, I confess that it has been difficult to assign one which is satisfactory. It cannot be a wave motion because the duration of each wave is too long to admit of anything resembling propagation. One suspects that there may be a tilting of the atmosphere from one continent to another, or from one hemisphere to the other, but when we consider the rapid motion of the upper strata of the atmosphere, it does not appear how it can so far deviate from its usual paths as to leave an entire continent lower or higher than the average for so long a time. *One may also suspect purely cosmical causes* due to the variable solar output; indeed, these barometric variations do closely follow the variations in the sunspot frequency and the other products of the sun's variable activity. From 1873 to 1890 there is a remarkable agreement between these two classes of phenomena, *but if the pressure period is 8 years and the sunspot period 11 years that connection cannot be complete in its nature.* It is evident that we shall be obliged to prosecute this study yet further by constructing similar barometric tables for other countries, in each hemisphere, and also that it will be well to include in our research some account of the temperature, the vapor tension, and the magnetic and electric fields of the atmosphere before attempting any further remarks on the subject. . . .

Finally, it is evident that for the United States we can now correlate the years which have similar secular variations, as 1878, 1885, and 1893, and study them climatologically to see if there are any marked and prevailing features which characterize them. *It is clear that this discussion opens to us for the first time the prospect of a scientific basis for seasonal forecasts,* certainly so if it should prove to be the case that the maximum-pressure years differ distinctly from the minimum-pressure years in their seasonal character, for in

> the event of our happening on a maximum year we could then predict the feature due to a falling barometer, or, if we are in a minimum year, to a rising barometer, at least for one or two years ahead.[11]

Upon the preceding passages I make these notes:

(1) As far back as 1901 the United States Weather Bureau isolated a cycle in the barometric pressure of the United States;

(2) That cycle was an eight-year cycle which was synchronous with the cycles in economics and meteorology to which constant reference has been made in this essay;

(3) Professor Bigelow regarded the isolation of the cycle as "an important discovery in barometric science," the discussion of which "opens to us for the first time the prospect of a scientific basis for seasonal forecasts";

(4) Professor Bigelow suspected a cosmical cause of the phenomenon, but known solar periodicities failed to satisfy the conditions: "if the pressure period is 8 years and the sun-spot period is 11 years that connection cannot be complete in its nature."

What is the cosmical cause of the eight-year cycle?

III. The Cause of the Eight-Year Generating Cycle

Is there a cosmical cycle of approximately eight years in length, the effects of which upon the Earth might account for the observed meteorological cycles? Let us divide this question into two and ask (1) is there a cosmical cycle of eight years in length which is synchronous with the observed meteorological cycles? (2) is there reason for believing that the cosmical cycle is accompanied with a synchronously varying force that could produce the observed meteorological cycles?

---

[11] Report of the Chief of the Weather Bureau, 1900, 1901, vol. ii, pp. 1004, 1005.

The first question may be answered definitely and positively: there is a cosmical cycle of about eight years that is synchronous with the economic and meteorological cycles the existence of which has already been established.

Perhaps the best way to approach its description is to consider these facts: the maximum visibility of Venus is produced by its greatest phase, its greatest elongation from the sun, and the clearness of our atmosphere, and that maximum tends to recur at intervals of eight years. "Vénus passe tous les huit ans par ses périodes de plus grand éclat (1889–1897–1905–1913). Elle est alors si brillante qu'elle porte ombre comme un petit clair de lune, et il est facile de s'en assurer soit en se plaçant dans une pièce obscure, soit en marchant devant un mur à la campagne. On peut la distinguer en plein jour, à l'œil nu, non seulement avant le coucher du soleil, mais à midi même, lorsque l'on sait où elle est. Aucune étoile ni aucune planète n'atteint un éclat comparable à celui-là."[12] Here is an eight-year cycle in which the dates of maxima are a little in advance of our economic and meteorological cycle. It is not the cycle that we want, but it is closely related to the one for which we are in search.

Before passing to a detailed consideration of the Venus cycle a prejudice must be noted and, if possible, removed. In suggesting that the variability in the brilliance of Venus may have some possible relation to terrestrial affairs one is reminded at once of the disdainful attitude of Laplace: "Vénus surpasse en clarté les autres planètes et les étoiles; elle est quelquefois si brillante, qu'on la voit en plein jour, à la vue simple. Ce phénomène qui revient assez souvent, ne manque jamais d'exciter une vive surprise; et le vulgaire, dans sa crédule ignorance, le suppose toujours lié aux événements contemporains les plus remarquables."[13] Now with regard to this remark, the substance of which is repeated by others in pamphlets and treatises, these comments should be made:

---

[12] Camille Flammarion, Rêves étoilés, pp. 132, 133.

(1) Laplace's scorn was directed towards the prognosticators who encouraged the belief that particular, isolated events were predictable from the aspect of Venus.

(2) Until many years after the death of Laplace, economic and meteorological observations had not been carried sufficiently far to admit of the isolation of long-time cycles showing mean results which could be associated with cosmical variations.

(3) Many physicists and astronomers of unquestioned sanity and proven ability have attempted to discover the effect of Venus upon the position and frequency of sunspots. If that is not a visionary inquiry when Venus is nearly three times further from the Sun than it is from the Earth, the consideration of the possible effects of that planet upon the weather of the Earth should not be regarded as a preposterous undertaking.

Returning now to the question of the periodicity in the motion of Venus with respect to the Earth let us first recall that the relative distances of the Earth and Venus from the Sun are as 1000 to 723; that the orbits of both planets are nearly circular; and that in size, Venus of all the planets most nearly approaches the Earth, its diameter being 7630 miles as compared with the 7918 miles of the Earth.

Let Figure 8 represent the orbits of Venus and the

---

[13] Laplace, Exposition du système du monde, Livre premier, chap. v.

Earth, the orbits being assumed, for the sake of simplicity, to be circles. At this stage no account is taken of the inclination of the plane of the orbit of Venus, which will be considered later on. The following simple description of when and where the two planets are in conjunction is given by R. A. Proctor in his *Transits of Venus:*

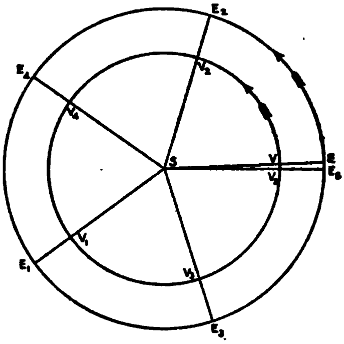


FIGURE 8. Illustration of the conjunctions of the Earth and Venus.

> Imagine that a straight pointer from the Sun to Venus, extending to the Earth's orbit, like the line SVE, is carried round S as a central pivot by the motion of the planet Venus. Then whenever this pointer comes up to the Earth, the three bodies — Sun, Earth, and Venus — are in conjunction. Now, Venus travels with a mean motion of 96′ 7″.8 per day around the Sun (completing a revolution in 224.701 days), while the Earth travels with a mean motion of 59′ 8″.3 (completing a revolution in 365.257 days); so that in each mean solar day Venus gains, on the average, 36′ 59″.5 upon the Earth. This is the rate at which our imaginary pointer, starting from a position such as SVE, sweeps onwards from the advancing Earth, so as to again reach the Earth by overtaking it, just as the minute-hand of a clock, after being in conjunction with the hour-hand, passes on towards its next conjunction, with the *excess* of its motion over the hour-hand. We have only, then, to ask how long it will take the pointer, with its mean daily gain of 36′ 59″.5, to gain one complete circuit, to have the interval in time between successive conjunctions of the Earth and Venus—in other words, there will be just as many days in this interval as the number of times 36′ 59″.5 is

contained in 360°, or, reducing both to seconds, as 2219.5 is contained in 1,296,000. The division . . . gives us 583.9 days.

Our Venus-carried pointer thus takes 583.9 days in overtaking the Earth. This is more than a year by about 218.6 days, in which period, with her mean motion of 59′ 8″.3 per day, the Earth travels round nearly 215½ degrees. Now, 216 degrees would be ⅗ of a complete circuit. We see, then, that the next conjunction-line must be set almost exactly ⅗ of the way round from SVE, or in the position SV_1E_1; the next will have the position SV_2E_2; the third will have the position SV_3E_3; the fourth, the position SV_4E_4; and the fifth will be close up to SVE, in the position SV_5E_5, about 2½ degrees behind SVE.

Since the interval between each conjunction is about a year and three-fifths, the whole time occupied before the position SV_5E_5 is reached by the conjunction-line will be five times 1⅗ years, or 8 years, less the short interval corresponding to the Earth's motion over the arc E_5E. We see, then, how it comes to pass that an interval of eight years brings round nearly the same circumstances as at the beginning of the interval, and why, therefore, when a transit has occurred, another may occur eight years later. . . .

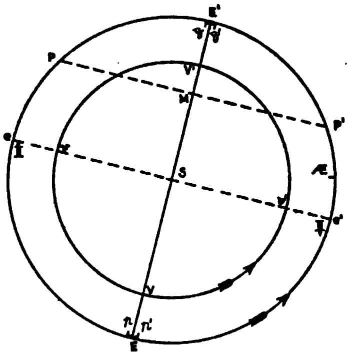


FIGURE 9. The transit regions (pp′ and qq′) in the Earth's orbit.

And now let us consider the effect of the inclination of the orbit of Venus to that of the Earth, still, for the sake of simplicity, leaving out of account the slight eccentricity of the orbits.

If EE′, VV′ (Figure 9), represent the two orbits,[14] and Æ be the place of the Earth at the autumnal equinox, then the line EE′ represents the intersection of the two orbit-planes; and if, as before, we regard the plane of the paper as containing the orbit EE′, then the part V′vV of the path of Venus is to be regarded as slightly above, the part Vv′V′ as slightly below, the plane of the paper. Accordingly the end of the pointer which we have supposed Venus to carry round the Sun, passes above the semi-circle E′eE and below the semi-circle Ee′E′. And supposing this pointer to be of the length SE, so that its end appreciably travels round Ee′E′e (except for the displacement below and above the plane of this orbit), it is easy to calculate how much above or below the level Ee′E′e the end of the pointer runs. When in the direction SE or SE′, of course the Venus-carried pointer has its extremity on the Earth's path; when in direction Sve or Sv′e′, at right angles to EE′, the end of the pointer is at its farthest from the plane Ee′E′e. The inclination of the orbit of Venus being about 3° 23½′, and the distance Se (the Earth's distance from the Sun) being about 91,430,000 miles,[15] it is easily calculated that the extremity of the pointer passes above *e* and below *e′* at a distance of about 5,409,000 miles. At any other point, as P or P′, the end is above or below by an amount less than 5,409,000 miles in the same degree that PM or P′M is less than eS, or e′S (PMP′ being drawn square to EE′).

---

[14] In the description of Figure 9 I have altered slightly Proctor's lettering so as to correspond with the use I shall make of the reasoning later on. Proctor starts with the transit of 1631 while I begin with that of 1761.

By means of this theorem Proctor computes that the length of the transit regions pp′, qq′ is about 3° 28′.

Figure 10 will facilitate the discussion of the eight-year cycle of Venus in its relation to the Earth and the Sun. In 1761 and in 1769 there were June transits of Venus and in 1874 and 1882 there were December transits. Let us assume that at the 1761 transit the Earth and Venus stood in their orbits at the points V and E. Then according to the reasoning which has just been traversed the next inferior conjunctions of Venus and the Earth were at E_1V_1, E_2V_2, E_3V_3, E_4V_4, E_5V_5. The conjunction at E_5V_5 was just 2° 22′ behind the point at which Venus and the Earth stood eight years before, and as E_5 fell within the transit region there was a June transit in 1769. Now just as the fifth conjunction E_5 was 2° 22′ behind E, so the sixth conjunction occurred 2° 22′ behind E_1; the seventh, 2° 22′ behind

---

[15] Proctor's work, Transits of Venus, was published in 1875. Since that date the mean distance of the Earth from the Sun has been ascertained to be about 92,900,000 miles. The difference between Proctor's figures and the real distance affects the accuracy of his subsequent calculations.

E_2; the eighth, 2° 22′ behind E_3; the ninth, 2° 22′ behind E_4; and the tenth, 2° 22′ behind E_5. In case of all five of the conjunction regions, there were inferior conjunctions 2° 22′ behind the points of conjunction which occurred eight years previously. The sequence is followed out in Figure 10 to the 81st conjunction.

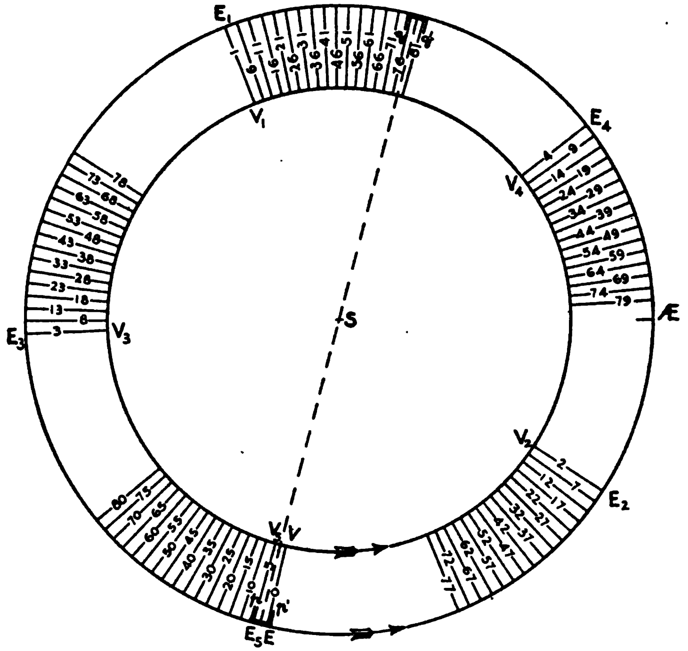


FIGURE 10. The regression of the conjunction lines of Venus and the Earth.

If now we keep the eye upon the two transit regions pp′, qq′, we observe that the recession of the conjunction lines at the rate of 2° 22′ in eight years caused the conjunctions in the region VE to recede from the transit region pp′, and those in the region V_1E_1 to approach the transit region qq′. The distance of E_1 from E is about 215½° and the distance of the transit region qq′ from the transit region pp′ is 180°. As the transit region is itself about 3° 28′, it is obvious that the distance of E_1 from the transit region is about 34°; and as the conjunctions in the region E_1 approach the transit region qq′ at the rate of 2° 22′ every eight years while the conjunctions in the region pp′ recede at the rate of 2° 22′ every eight years, it is clear that a conjunction must occur within 17° of either the pp′ or the qq′ transit region every eight years. It is this eight-yearly conjunction in the neighborhood of the transit regions which is synchronous with the eight-yearly terrestrial phenomena that we have already described. This eight-yearly cycle is the Venus cycle for which we have been in search.

Up to this point no account has been taken of the small eccentricities in the orbits of the Earth and Venus and of the unequal motions of the planets in the different parts of their orbits. The consequences of these facts are so well known that they have been calculated,[16] and it is sufficient for our purpose to observe that the eight-year sequence in the transit regions — the Venus cycle — still persists when the eccentricities of the orbits and the varying motions of the planets are taken into consideration.

We see, therefore, that in 1761 and again in 1769 the Earth, Venus and the Sun were in a straight line in the transit region pp′; they were again in a straight line in 1874 and 1882 in the transit region qq′. Between the limiting dates 1761 and 1882, at intervals of approximately eight years, the Earth, Venus, and the Sun, in this sequence, made their nearest approach to being in a straight line. After 1882 until the date of the next transit in 2004, the Earth, Venus and the Sun will make this maximum approach to a straight line, in this sequence, at intervals of approximately eight years.

---

16. Proctor, Transits of Venus, pp. 111-118.

Now the longest record we have of economic cycles is given in Figure 4, which is the record of the crops in England. That invaluable sequence runs from 1760 to 1914. The maxima of the crop cycles occurred at 1762 and at intervals of eight years thereafter. The Venus cycle had maxima in June 1761 and approximately eight years thereafter, so that at intervals of eight years before and after the dates of the last transits in December 1874 and 1882, the maxima of the economic, meteorological, and Venus cycles were congruent.

We come now to the second part of our question: is there reason for believing that the Venus cycle is accompanied with a synchronously varying force which could produce the observed meteorological cycles? Here our point of departure is a comparatively recent discovery of great importance relating to the period of rotation of Venus upon its axis.

From the observations of some faint markings supposedly on the surface of Venus, Domenico Cassini of Bologna in 1666–67 inferred that the period of rotation was about twenty-three hours. J. J. Cassini, in 1740, gave a more exact estimate of twenty-three hours and twenty minutes. Schroeter, in 1789, fixed the period at twenty-three hours and twenty-one minutes, and De Vico, in 1839–41, carried the spurious accuracy to twenty-three hours, twenty-one minutes, and twenty-two seconds. So the matter remained until 1890, when Schiaparelli announced his surprising discovery.

Schiaparelli made the innovation of conducting his observations by day, as near to noon as possible, when Venus would be highest and its own glare reduced by the brilliant midday sky. From a long series of careful observations he concluded that the period of rotation of Venus upon its axis could be nothing like twenty-four hours, but must lie between six and nine months and very probably agreed exactly with its period of revolution around the Sun, which is, approximately, 225 days.

In 1896 the question was made the subject of research by Percival Lowell with the assistance of an accomplished staff, at his observatory in the clear air of Flagstaff, Arizona. The markings noted by Schiaparelli upon which he based his conclusions as to the long period of rotation were verified at the Lowell Observatory, and in addition new markings were discovered and photographed. "By watching them assiduously it was possible to note that no change in position occurred in them, first through an interval of five hours, then through one of days, then of weeks. Care was taken to guard against illusion. It thus became evident that they bore always the same relation to the illuminated portion of the disk. This illuminated part, then, never changed. In other words, the planet turned always the same face to the Sun. The fact lay beyond a doubt, though of course not beyond a doubter."[17] Thirteen years after these first discoveries Professor Lowell repeated, in 1909, the account of his early work and then said "the years that have passed since these observations were made have brought corroboration of them. Several observers at Flagstaff have seen and drawn them and added discoveries of their own."[18]

The conclusion that the period of rotation of Venus upon its axis is the same as its period of revolution around the Sun was reached by Schiaparelli and Lowell from telescopic observations. There was, of course, the possibility, tho not the probability, that both observers had been misled by visual errors. But no such deception could occur with the spectroscope, and to make sure of his ground Lowell installed at his observatory a spectroscopic equipment. The investigator was Dr. Slipher, the present Director of the Lowell Observatory. The accuracy with which Dr. Slipher could determine the rotation period of a planet by means of spectrograms was tested by his spectroscopic approximation of the well known periods of rotation of Mars and Jupiter. The rotation period of Mars is known to be $24^h\ 37^m\ 23^s.66$. Dr. Slipher determined its period from spectrograms within an hour of the true time. The rotation period of Jupiter is $9^h\ 50^m.4$. Dr. Slipher found the rotation period from spectrograms to be $9^h\ 50^m$, or within a minute of the exact time. When in an exactly similar manner, he made his observation of Venus, the spectrograms showed that the rotation period must exceed three months, which meant that so slow a rotation as three months was beyond the power of Dr. Slipher's spectroscope to disclose.[19]

---

[17] Percival Lowell, The Evolution of Worlds, pp. 77–79.

[18] Ibid., p. 79.

Lowell regarded Dr. Slipher's spectrogram report as confirmatory of Schiaparelli's conclusion and his own that Venus rotates on its axis in the same time that it revolves around the Sun, turning always the same side to the source of light and heat.

The bearing of this discovery upon the theory of the effect of Venus upon terrestrial meteorological cycles we shall approach by considering the following quotation from Lowell: "That Venus turns on her axis in the same time that she revolves about the Sun, in consequence of which she turns always the same face to him, must cause a state of things of which we can form but faint conception, from any earthly analogy. One face baked for countless aeons, and still baking, backed by one chilled by everlasting night, while both are still surrounded by air, must produce indraughts from the cold to the hot side of tremendous power. A funnel-like rise must take place in the centre of the illuminated hemisphere, and the partial vacuum thus formed would be filled by air drawn from its periphery which, in its turn, would draw from the regions of the night side. Such winds would sweep the surface as they entered, becoming less superficial as they advanced, and the marks of their inrush might well be discernible even at the distance we are off." [20]

---

[19] Lowell, The Evolution of Worlds, pp. 83–89.

The last part of this quotation is perhaps hyperbole. I am very far from wishing to suggest that the winds of Venus may be directly responsible for the periodicity in terrestrial weather. Our question is this: is there reason for believing that the Venus cycle is accompanied with a synchronously varying force which could produce the terrestrial meteorological cycles? The consequence of the long rotation period of Venus with the one face always turned towards the Sun is that the planet is in a constant state of violent meteorological commotion on a vast scale; and this planet, which is about the size of the Earth, thrusts itself at intervals of eight years almost exactly in the direct path of radiation from the Sun to the Earth. Is it not probable that the storm-racked planet creates a disturbance in the interplanetary medium which affects the Sun's radiation on its way to the Earth? If that is the case, then the cause of the eight-year generating cycle is the planet Venus in its eight-yearly periodic motion with respect to the Earth and the Sun.

HENRY LUDWELL MOORE.

COLUMBIA UNIVERSITY,
NEW YORK.

---

[20] The Evolution of Worlds, pp. 80–82.

THE RAILROADS UNDER GOVERNMENT OPERATION. II. FROM JANUARY 1, 1919, TO MARCH 1, 1920[1]

SUMMARY

I. Characteristics of this period, 30. — II. Labor policies. The national agreements, 35. — Extreme standardization of wages, 36. — Centralization in dealing with disputes and impairment of discipline, 39. — III. Relations with state commissions, 41. — Rate adjustments, 43. — Policy toward further advances in rates, 45. — Final refusal to make advances, 45. — IV. Upkeep of physical property. Provisions of the Control Act, 47. — Financial figures indicate adequate maintenance, figures in terms of physical units do not, 50. — The case of freight cars, 51. — V. Additions and betterments, 54. — VI. Financial result of the entire period of federal control, 57. — VII. How far the Administration policy of unification has proved permanent, 61. — VIII. Conclusion, 67.

I. Characteristics of the Second Period

The situation with which the Director General of Railroads had to deal during the second year of federal control of railroads was different in many respects from that of 1918. During the first year (1918) the controlling motive was to operate the railroads as an effective part of the government's war organization. The compelling forces of patriotism were behind the employees, the officials, and the general public. The railroad organization worked faithfully to produce the kind and the volume of transportation which was vitally necessary for war purposes, and the public coöperated willingly in accepting war-time restrictions in service. As has already been indicated, the results were fairly satisfactory from the viewpoint of the emergency which federal control was intended to meet.

---

[1] For the first article, on the period to the close of 1918, see this Journal for February, 1921.

The less satisfactory record of 1919, the second year of federal control, may be partly explained by the changed conditions. The spur of patriotism behind the working forces was lacking. The war-time tension relaxed almost immediately after the signing of the armistice and there was a distinct lowering in morale. Shippers, travelers, and state-regulating authorities began a campaign to restore the pre-war status. Congress adopted a critical attitude toward the Railroad Administration and withheld the appropriations recommended by the Director General. The decline in traffic and the shrinkage in net income compelled a closer scrutiny of expenses. The atmosphere was befogged by propaganda designed to create a favorable public attitude toward each of the many plans advanced for the solution of the railroad problem, and practically all of the propagandists set out to discredit the record of the Railroad Administration. Then, too, there was the normal reaction on the part of the general public against the continuation of war-time government control.

Just before Mr. McAdoo's retirement from the office of Director General he advocated a continuation of federal control for five years. The Federal Control Act provided that the railroads should be returned to their owners within twenty-one months "following the date of the proclamation by the President of the exchange of ratifications of the treaty of peace." Mr. McAdoo expressed the view that federal control during one year of war and one or two years of the reconstruction period (on the eve of a presidential campaign) would not furnish an adequate test of the advantages of unified operation. He feared that most of the "fundamental reforms" inaugurated during his régime as

Director General could not be continued "if the country prefers to continue in existence the hundreds of different railroad companies as in the past." He believed that a five-year extension of operation by the government would permit the successful carrying out of a farsighted program of improvement and further unification of [illegible] facilities, and that this additional experience in federal operation under peace conditions would give the desired demonstration of the value of unified control and direction. With such further experience as a guide Congress could more intelligently take up the task of legislating for a permanent solution.[2]

On January 11, 1919, Mr. McAdoo retired as Director General and was succeeded by Walker D. Hines, his principal assistant. When Mr. Hines, early in February, appeared before the Senate Committee on Interstate Commerce, he supported his predecessor's suggestion that the tenure of federal control be continued for five years. At the same time he made certain suggestions embodying his own views as to what should be the basis of a permanent plan for adoption at the end of the five-year period.

In advocating an extension of federal control Mr. Hines placed himself on the defensive. The opinion was held in some quarters that the Railroad Administration was more interested in perpetuating itself than in responding to the general public demand for legislation which would bring about a safe and speedy return of the roads to private management. Mr. Hines, however, never ardent in his advocacy of an extension of federal control, soon changed his position. In a number of public addresses throughout the South and West during the late spring and early summer of 1919 he suggested a plan of his own under which the roads would be restored to their owners as soon as the necessary legislation could be enacted, and under which they would be operated in a small number of large systems, their directorates to include representatives of the government and of labor.

---

[2] Statement of Mr. McAdoo before the Committee on Interstate Commerce, United States Senate, January 3, 1919.

Throughout his entire term of office Mr. Hines was subjected to much criticism. It should be noted, however, that this criticism came from nearly every one of the divergent interests. The view of the railroad executives was that the Administration was not always fair in its treatment of the interests of the owners of the properties, as for example in the matter of maintenance, and that its failure to advance rates in 1919 to meet the higher operating costs unfairly placed upon the railroads the onus of advancing rates after the roads were returned. These rate advances were made necessary, in greater part, by radically increased wage scales and by the adoption during the closing months of federal control of the restrictive rules in the so-called national agreements. On the part of labor Mr. Hines was criticized because in the latter part of 1919 he refused to be stampeded into granting additional concerted wage demands from practically every class of railroad labor. Instead he insisted that these demands should be reviewed by a tribunal to be appointed by Congress for that specific purpose. Congress, however, refused to entertain the suggestion and reminded the Director General that he had ample authority to deal with the situation himself. On the part of shippers there was dissatisfaction because many of the privileges which were curtailed during the war were not promptly or fully restored, and because requests for downward revision of certain rates were not all favorably acted upon. On the part of Congress there was fault-finding because of the large operating deficits and there was a disposition to embarrass the Railroad

Administration by neglecting to provide the working capital which Mr. Hines recommended. On the part of the state commissions there was resentment against the continuation of the war-time power of the federal administration, which crippled the states in their efforts to resume intrastate rate regulation on the pre-war basis.

It will be seen, therefore, that Mr. Hines' administration failed to satisfy any one group, and that he was beset with difficulties much greater than those with which Mr. McAdoo had to deal during his war-time régime. Mr. Hines had a thankless task. No review of his stewardship would be complete if it failed to record a tribute to his courage in adhering consistently to his conception of his responsibility to the broad and long-time interests of the nation. He remained in office at a substantial personal sacrifice and severely taxed his health by devotion to his work. If he made mistakes in policy, they were as a rule the result of an over-conscientious attitude toward his duty as the representative of the government. During a large part of his term in office he was unable to consult freely with the President and therefore was obliged in many important matters of policy to act upon his own initiative and responsibility.

At the time of his appointment as Director General Mr. Hines announced that he proposed to carry forward the policies "so ably put into effect by Mr. McAdoo — fidelity to public interest, a square deal for labor, with not only an ungrudging but a sincere and cordial recognition of its partnership, and fair treatment for the owners of the railroad properties and for those with whom the railroads have business dealings."[3]

Within the limits of this article it is possible to touch only upon the more important phases of Mr. Hines' administration. These had to do with labor policies; coöperation with state and interstate regulating authorities; rate increases and adjustments; control of maintenance expenditures; and enlargement and improvement of facilities and equipment.

---

[3] Public statement, January 11, 1919.

II. Labor Policies

Large increases in wage rates and expensive concessions to labor on conditions of employment were phenommena of the war. Their effects upon the railroad payroll were probably no greater in degree than upon the labor costs of other industries. In fact the general average percentage of increase in railroad wage rates during the years 1918 and 1919 was probably less than in other directions. The railroad increases, however, affected payrolls containing the names of approximately two millions of employees. It was the magnitude of the absolute increases rather than the degree of the increase that attracted public attention. In the aggregate the higher wage rates and the more favorable working rules made effective during federal control had the effect of increasing the railroad wage costs at the annual rate of about one billion dollars. The estimate is based upon a comparison of wage earnings at the end of federal control with those of December, 1917; in making it the wage advances of 1918 as well as those of 1919, the effect of the universal application of the eight-hour day, and the added expense of punitive rates for overtime are taken into consideration. During the latter part of 1919 Mr. Hines stated that the wage rates in effect at that time, expressed in average earnings per hour or per day, were approximately 56 per cent greater than those of December, 1917. Between the date of his statement and the termination of federal control further upward adjustments were made, such as the application of punitive overtime in freight train service and the adoption in the national agreements of many new rules which had the effect of swelling payroll costs. These rules not only increased the compensation to the individual but required the employment of more men for the same amount of work. An indication of the effect of the higher wage rates and changes in rules upon net income is afforded by the relation of total wages to operating revenues. In 1917 labor was paid 43.3 cents out of each dollar of operating revenues. The comparable figure for 1919 was 55.3 cents.[4]

Such exception as may be taken to the labor policy of the Railroad Administration applies particularly to the punitive and restrictive rules in the national agreements, to the extension of the principle of standardization, and to the extreme centralized control of labor relations. The national agreement with the shop crafts was drawn up by a committee of four subordinate officers of the Administration in conference with representatives of the labor organizations.[5] No member of this committee of subordinate officers had had any railroad managerial experience of responsible character. The chairman had once been an enginehouse foreman; one member of the committee was serving the Administration while on leave of absence from his regular duties as president of one of the unions affected by the agreement; the third member had once served as an enginehouse or boilershop foreman; the fourth member had once been a locomotive firemen and had served as a local chairman for the fireman's organization on one road. The agreement as tentatively agreed to by this committee and the representatives of the unions was sent to the Director General with the recommendation of the Director of the Division of Operation and was signed by the Director General on September 20, 1919. It should be noted that neither the regional directors nor the federal managers in charge of the respective railroad units had anything to do with the agreement.[6]

---

[4] Table 15, exhibits of Bureau of Railway Economics, presented as evidence before Senate Committee on Interstate Commerce, June 15, 1921. These ratios and the estimate of one billion dollars of aggregate increase in wage payments take no account of the further increase of over $600,000,000 per year awarded by the Railroad Labor Board in May, 1920. In the year 1920 labor was paid 59.9 cents out of each dollar of operating revenues.

[5] These agreements were made with labor organisations affiliated with the American Federation of Labor. There were no such agreements with enginemen, firemen, conductors or trainmen.

The national agreement with the shop crafts was followed by one with maintenance of way employees. It was dated November 22, 1919. The third, with clerks, freight handlers and station employees, was signed on January 1, 1920. The fourth and fifth agreements were with stationary firemen and oilers and with railroad signalmen. They became effective on January 16, 1920, and February 1, 1920, respectively. It will be noted that all of these agreements were made subsequent to May 20, 1919, when the President announced that the roads would be returned to their owners, and three out of the five agreements were entered into when it was known that federal control would terminate within two months. The railroad executives, therefore, had ground for criticizing the Director General for assuming the burdens which these agreements passed on to the railroads while he was unwilling at the same time to assume the responsibility for increasing freight and passenger rates so as to meet the additional expenses.[7]

---

[6] This explanation is given as a partial answer to a question which entered the minds of many persons who read about the questionable features of the agreement in the press reports of the hearings before the Railroad Labor Board during the summer of 1921, when the railroads sought to have these agreements abrogated. Inasmuch as it is generally understood that the Railroad Administration was composed of former railroad officers temporarily serving the government it was natural to ask why these inequitable rules were agreed to in the first place.

Prior to the events which led up to the passage of the Adamson Act late in 1916, the relations between the railroad managements and their employees on the typical railroad were reasonably harmonious. It is true that these intimate relations had begun to dissolve before the roads were taken by the government. But during the twenty-six months of centralized power over practically everything that had to do with the pay envelope and with working conditions, the control of local officers over their employees was much weakened. While there had been some standardization of wages and working rules in certain classes of service,[8] the policies of standardization in these matters were carried to an extreme degree during the life of the Railroad Administration. Rates of pay and conditions of employment in nearly all classes of service were made uniform in every part of the country. A car inspector in a small town in Florida received the same rate of pay as one who worked in Chicago or St. Paul. A station clerk in a small inland town worked under the same scale as one who had to assume the higher living costs of Boston. The colored women who cleaned cars in the South were awarded the same wages as white men or white women who did similar work in New York or Pittsburgh. If the standards adopted were reasonable for the lower living costs of the South, they could not be reasonable for the northern sections of the country, particularly in urban communities where rents, fuel, and other costs of living were much higher. If the standards were reasonably sufficient for northern cities they must have been unreasonably high for the southern states. Yet an inflexible uniformity in wage rates and in rules affecting hours of service or other terms of employment was prescribed for nearly every class of service regardless of differences in going rates, in rates or rules for similar employment in competing industries, in the severity of work, density of traffic, relative degree of experience, and the local purchasing power of the dollar.

---

[7] The statement has been made privately that these agreements were made to redeem a pledge between the Administration and the unions while the war was in progress. The writer has no personal knowledge as to the ground for the statement, but if true it has an important bearing on the case. The early negotiations looking toward the first agreement were begun many months before the document was finally signed.

[8] See article by the present writer on "Standardizing the Wages of Railroad Trainmen" in this Journal, vol. xxv, pp. 139–160; and "The Locomotive Engineers' Arbitration," ibid., vol. xxvii, pp. 263–294.

In the brief account (in the preceding article) of labor policies during the year 1918 no reference was made to the Boards of Adjustment which were created during the first year of federal control. These boards, three in number, supplemented the work of the Board of Railroad Wages and Working Conditions, and gave effect to understandings reached between the regional directors and the executives of the unions, under which bi-partisan boards were to be established to adjust controversies as to discipline, interpretation of rules, or other similar grievances. An unfortunate effect of the centralization of the machinery for determining wage rates and rules and for the adjustment of grievances was that of undermining the influence of the officers in authority locally on the individual roads, and thereby of impairing discipline. Throughout the entire period of federal control there was a growing tendency on the part of employees to disregard their immediate superiors and the federal managers also, and to go to Washington with all sorts of grievances, many of them trivial. Tho a substantial portion of these complaints were decided against the employees, the net effect, particularly during the last fourteen months of federal control, was to reduce the local officers to mere figureheads in the adjustment of labor differences. According to the rules of procedure each case had first to be presented to the local officers, but generally that was a mere formality incident to the final reference of the case to the centralized boards. The attitude of the employees grew to be that their real friends and the real power were in Washington. The local officers found themselves unable to adjust even minor differences unless the employees' position were conceded in full, and on the part of these officers there grew to be an inclination to let the central administration assume the responsibility which should go with the authority to settle controversies.[9] Under such circumstances it was inevitable that discipline should be impaired and that the morale of the service should suffer.[10]

The year 1918 had been free from railroad strikes. Such was not the case in 1919. The annual report of the Division of Labor for that year lists thirty-three strikes among railroad and express service employees. In addition there were thirteen strikes by marine and water-front employees. While most of the marine and water-front strikes were authorized by the union executives, none of the thirty-three among railroad and express service employees had the sanction of the national leaders. Tho all of the strikes were local in their appli-

---

9. An examination of the decisions of the Boards of Adjustment indicates a wide variation in the number of cases presented to the Boards by the employees or the management of individual roads. Some roads had but few cases; others had many. It is not possible without an intimate knowledge of the facts to say whether in the first set of cases the freedom from dispute was the result of exceptionally harmonious conditions and disinclination upon the part of employees to appeal, or whether it was the result of weakness on the part of the management in avoiding trouble by conceding practically all claims. In the second set it is not possible to state with assurance whether the many disputes were caused by an exceptional lack of harmony and a disposition upon the part of employees to seek for cases to appeal, or to a narrow or unbending attitude on the part of the management to concede nothing of a controversial nature and to play safe by shifting the responsibility to Washington.

10. This state of affairs was aggravated by the persistent advocacy of the Plumb plan for "democratic control of railroads."

cation, some had far-reaching effects. Most of the trouble was with unskilled workers of the more radical type. The train service brotherhoods were concerned in but one strike, which was called locally in sympathy with striking employees of an interurban electric road. In twenty-four out of the thirty-three cases the trouble arose because shopmen, enginehouse men and car repairers took things into their own hands and disregarded the orders of their national executives.

III. Relations with State Commissions; Attitude on Rate Adjustments

One of the first important steps taken by Mr. Hines after he became Director General was to divide the Division of Public Service and Accounting into two separate divisions. The late Judge Prouty remained in charge of accounting, and Max Thelen, formerly chairman of the California Railroad Commission and of the National Association of Railroad Commissioners, was appointed Director of Public Service, effective February 1, 1919.

Following a conference between the Railroad Administration and a committee representing the state railroad commissioners the relations between the federal and the state authorities were clarified by the publication of General Order 58, of February 20, 1919, in which the Director General recognized the jurisdiction of the states over railroads under federal control in such matters as spur tracks, railroad crossings, safety appliances, track connections, train service, station facilities, the investigation of accidents, and other matters of local service, safety and equipment. Officers and employees of the Railroad Administration were instructed to coöperate with the state commissions and the Divisions of Traffic and of Public Service were directed to secure the advice and suggestions of the appropriate state commissions before authorizing advances of any importance in rates, interstate as well as intrastate. The fundamental question as to the paramount authority of the federal government was left for determination by the courts.

The publication of General Order 58 did much to mollify the state commissioners. Throughout the remainder of the period of federal control the relations between the Director General and the state regulating authorities were harmonious. Mr. Hines adopted also a policy of seeking the advice and coöperation of the Interstate Commerce Commission. That body had been virtually quiescent during the year 1918, since under the Federal Control Act most of the Commission's powers over rates were delegated to the Director General during the period of federal control.

In addition to these measures, which afforded scope for action on the part of the public regulating authorities, steps were taken by the Railroad Administration which gave shippers a greater voice in the councils of the traffic and operating departments. In 1918 the shippers had a minority representation in the thirty-three freight traffic committees which were created to consider proposals for changes in rates or rules. Early in 1919 the minority representation of industrial traffic managers was increased to equal representation, and the shippers had representatives also on each of the seventy-three terminal committees created by the Administration to regulate terminal operation, car service, and similar matters. The participation of the shippers' traffic experts on these traffic and terminal committees did much to clear up misunderstandings or to clarify the points of difference.

The general upward revision of freight rates in June, 1918, had been accomplished, with few exceptions, by applying a horizontal increase of 25 per cent. It is obvious, therefore, that in the cases wherein certain commercial relationships were based on freight rate differentials *in cents per 100 pounds*, the application of the percentage increase had the effect not only of increasing the rates but also of changing the absolute spread between the related rates. In many cases the shippers were more interested in maintaining the differentials than they were in the absolute rates. Much of the work of the Division of Public Service, the Division of Traffic, and the regional and local committees had to do with readjusting rates and rules so as to restore former relationships. This work began immediately after the general rate increase of June, 1918, but in 1919 it was carried on more intensively. The report of the Division of Traffic for 1919 indicates that subsequent to August 1, 1919, there were 7804 individual changes authorized.[11] Of these rate changes 63 per cent applied to interstate rates and 37 per cent affected intrastate rates. The nature of the changes, in per cent of total, is shown in the following table, taken from the 1919 annual report of the Division of Public Service:

PERCENTAGE OF TOTAL CHANGES IN RATES

Nature of Change	Interstate	Intrastate
Reductions	76%	88%
Advances	12	..
Advances and reductions	7	8
Advances to meet decisions of I. C. C.	5	..
Correction of errors	..	4
Total	100	100

---

[11] The report does not specify the closing date of the period to which the statistics apply. Presumably the period was from August 1, 1919, to the date of the report, December 15, 1919.

While there was also some activity on the part of the state commissions and other representatives of the traveling public in the matter of passenger rate adjustments, very little was done to change the minimum flat rate of three cents per mile established by Director General McAdoo in June, 1918. Requests of certain states to have rates higher than three cents per mile reduced to that basis were denied.

The summary of the results for 1918, given in the preceding article,[12] drew attention to the deficit of approximately $245,000,000. The tabulation shows that for Class 1 roads the operating revenues had increased $853,868,213, while the operating expenses had increased $1,130,770,166. It was noted further that if the rate advances of June, 1918, had been made effective on January 1, 1918, the additional revenue, based on the traffic which actually moved during the first five months of the year, would have been $494,000,000. This additional revenue, if it had been available, would have left a surplus of approximately $249,000,000 instead of a deficit.

When Mr. McAdoo appeared before the Senate Committee on Interstate Commerce on January 3, 1919, (a week before his retirement as Director General) he estimated that the results for 1919 would show a surplus. In other words he believed that with the rate increases of June, 1918 in effect throughout the entire year 1919, the net operating income would exceed the guaranteed rentals. In making this estimate he did not anticipate that freight traffic in 1919 would be much smaller than in 1918, nor did he take into account the possibility of further advances in wage rates and further increases in the cost of materials.

When the figures for the early months of 1919 became available they showed startling deficits. The net result (in even figures) for January was a loss of $36,000,000; in February it was $35,000,000; in March it was $25,000,000. During the first six months of the year the net operating income fell short by over $227,000,000 of meeting the guaranteed rentals.[13]

---

[12] In this Journal, February, 1921, p. 339.

During the early part of 1919 serious consideration was given to the suggestion that there should be a further increase in rates, and the traffic, operating, and accounting divisions made studies which were intended to be the basis for such a general advance. There was a general feeling throughout the Administration that substantial increases would be necessary to enable the government to meet its guaranteed rentals, and that the Director General could not afford to pile up additional millions per month upon the already large deficit.

Mr. Hines gave serious consideration to these suggestions, but refrained from taking action. During the second half of 1919, when it appeared that he did not intend to order the advances, and when the second cycle of wage increases began to show its effect upon operating expenses, the executives of the railroad companies, looking forward to the return of the roads on December 31, 1919, were seriously disturbed. They pressed upon Mr. Hines their view that he should exercise his authority and advance rates, so that the properties would be self-sustaining when they were turned back to private operation.

On October 7, 1919, Mr. Hines announced his definite conclusion that the government should not increase the rates. On October 13 the chairman of the Association of Railway Executives formally protested against the decision and submitted a resolution adopted by the Association which insisted "that the duty rests upon the Government to restore, on its own initiative and by its own action, the relationship between revenues and expenses which the Government's action in increasing expenses had disturbed, and that appropriate action in this direction is necessary in order to be in conformity with the statement of the President, when the railroads were taken over by the Government, that investors in railroad securities might rest assured that their rights and interests would be as scrupulously looked after by the Government as they would be by the directors of the several railway systems."

---

[13] These figures apply to Class I roads. They do not include the smaller roads and the terminal companies, nor do they make any allowances for losses from the operation of the express and Pullman services and the water lines, and the expenses of the central and regional administrative organization.

In reply to this protest Mr. Hines declined to change his position, which he stated had been taken with the approval of the President. Having decided that it was not in public interest to make an immediate increase in rates for the purpose of increasing the revenues of the Railroad Administration during the remaining months of federal control, Mr. Hines held that a fundamentally wrong conception was involved in the claim that the President ought to exercise the emergency rate-making power for the purpose of deciding as between the railroads and the public what the former should charge and what the latter should pay *after the end of federal control.* He held that the guarantee applied only to the federal control period and he disagreed with the railroad executives that the abnormal increases were peculiar to government operation. In his opinion the increases in expenses would have taken place if the Railroad Administration had not been in existence.

IV. UPKEEP OF PHYSICAL PROPERTY

With his proclamation of December 26, 1917, taking over the railroads the President had issued a statement which explained why the step was necessary and offered certain assurances to the holders of railroad securities. Among these assurances was the promise that he would immediately recommend to Congress the establishment of definite guarantees that the railroad properties should be maintained in as good repair and as complete in equipment as when taken over by the government. The recommendation was made, and it was adopted by Congress as part of Section 1 of the Federal Control Act. The principle, however, was expressed in general terms. The accounting details were left to be worked out later in the contract to be agreed upon by the Director General and the individual railroad companies. There was much discussion on this point between the legal representatives of the Administration and of the railroad companies, and the up-keep section of the standard contract was rewritten several times before an agreement was finally reached. As finally adopted the contract required the Director General to expend for maintenance such sums as would be requisite in order that the properties might be returned to the companies at the end of federal control in substantially as good repair and substantially as complete in equipment as they were on January 1, 1918. As no inspection or appraisal of condition was made when federal control began it was necessary to adopt some accounting expedient to measure the obligation of the government, and the contract contained the proviso "that the annual expenditures and charges for such purposes during the period of federal control on such property, and the fair distribution thereof over the same, or the payment into funds of an amount equal in the aggregate . . . to the average expenditures and charges for such purposes . . . during the test period [three years ended June 30, 1917] . . . shall be taken as a full compliance with the foregoing covenant. . . . Due allowance shall be made for any difference that may exist between the cost of labor and materials, and between the amount of property taken over, . . . and for any difference in use . . . substantial enough to be considered, so that the result shall be, as nearly as practicable, the same relative amount, character, and durability of physical reparation."

During the year 1918, while the war was in progress, little thought was given to questions of final accounting. The Administration did its best to maintain the properties so that they might function effectively in meeting the demands of war traffic. No limitations as to maintenance expenditures were placed upon the federal managers except those which were caused by shortages in labor and materials. But when the war was over, when it became evident that the railroads would be returned to private operation by the end of 1919, and when the decline in the volume of traffic coupled with additional increases in wages and higher material costs caused alarming deficits in the early months of 1919, the Director General began to give much personal attention to maintenance expenditures. He impressed upon the regional directors and the federal managers the importance of using care to see that the obligations of the government were not exceeded, and effective steps were taken, beginning in May, 1919, to restrict maintenance expenditures to a budget allowance authorized for each road by the engineering staff of the central administration.

Early in the year, and before it was known that a budget system for maintenance expenditures would be enforced, the federal managers, following the conventional custom, had laid out their programs for the maintenance season according to their conception of the necessities, and most of them had organized their forces. They were, therefore, greatly disturbed when they received instructions, based on the Director General's telegram of May 27 to regional directors, to limit the June maintenance of way expenditures to an amount which would bear the same ratio to operating revenues that such expenditures on each road during the entire three years of the test period bore to the operating revenues of that period. While it was generally understood that the instructions applying only to June expenditures were intended merely as an emergency brake upon expenditures pending a more deliberate determination of the program for the remainder of the year, and while the drastic restrictions applying to June were quickly canceled, the effect was to slow up the maintenance programs until the budget system could be installed, and to disorganize the maintenance forces.[14]

It was apparent that the Director General feared that the natural desire of the federal managers would be to err on the side of liberality in expenditure so that the properties could be put in good condition prior to their return to private management, and that he took a serious view of his responsibility of protecting the government against overexpenditure. He believed that it would be better to lean toward the side of underexpenditure and settle in cash at the end of federal control, placing upon the railroad companies the burden of proving undermaintenance, rather than run the risk of going beyond the obligation of the government and thereby place upon it the burden of proving overexpenditure.

---

[14] "This change in the maintenance of way policy of the Railroad Administration from one of most liberal authority by the individual road to a plan of rigid control of expenditures led to a considerable undercurrent of resentment upon the part of railroad officers, both Federal and corporate, although much of the criticism would have been avoided if the statistical data on maintenance had been compiled soon enough to have permitted the formulation of a maintenance program before the inception of the season's work. Coming in June, at the height of the season, this curtailment was particularly unfortunate." Railway Age, June 2, 1920, vol. 69, p. 58.

Throughout his entire term of office Director General Hines held to the view and frequently stated that the maintenance expenditures of the Railroad Administration were being made on a scale which would meet the government's obligation under the proviso in the contract based on the test period. It was his belief that at the end of federal control the government would be indebted to some of the carriers for inadequacy in some elements in maintenance and that on the other hand some of the carriers would be indebted to the government for overmaintenance in certain elements. On the whole, he believed that these would about offset each other, and in estimating the net financial result of federal control in his last report to the President he made no allowance for claims for undermaintenance.

An examination of the expenditures during federal control would indicate that Mr. Hines had reason to believe that his position was sound. The average yearly expenditures for maintenance (way, structures and equipment) during the test period were $963,970,719. In 1916 they were $1,742,001,074, and in 1919 they were $1,982,793,296. These figures indicate that the increase in expenditures over the test period was 81 per cent in 1918 and 106 per cent in 1919, an average increase of 93 per cent for the two years. The increase in maintenance of equipment was relatively greater than in maintenance of way — 105 per cent for equipment and 76 per cent for way and structures.[15] No information as to the relative cost of labor and prices of material in the test and control periods has been made public, but it is unlikely that wage rates and material costs combined were more than 93 per cent greater than in the test period.

---

[15] Based upon statistics compiled by the Operating Statistics Section of the Railroad Administration. The figures apply to all Class I roads.

None the less, the properties were not fully maintained. In the single item of cross ties the average renewals per year in the test period were 83,885,109. The average yearly renewals in 1918 and 1919 were 71,363,083. This does not give a complete picture because in many cases the renewals in 1918–19 were in ties of lower grade than those used in the test period. The average annual renewals in rails during the test period were 2,041,676 tons. The rail renewals in 1918–19 were at the rate of 1,821,561 per year. The ballast renewals in the test period were 17,065,599 cubic yards. The comparable figures for 1918–19 were 16,157,522, but in some cases gravel ballast was used instead of crushed stone.[16] In addition to the inadequacies in the renewals of ties, rail and ballast, there was inadequacy in the maintenance of structures, mainly in painting. These, however, cannot be stated in exact units.

In the case of locomotives the maintenance was fairly adequate, but both freight and passenger cars were in relatively inferior condition when the roads were returned. The failure to keep up freight car repairs may be attributed in greater part to pooling. With respect to passenger cars it was impracticable to release them from service for the usual periodical shop overhauling, because every car was urgently needed in 1918 for the movement of troops from camps to seaboard and in 1919 for the demobilization of the army.

The case of freight cars requires further explanation. Prior to federal control the joint use of freight cars by all roads was governed by the car service and the per diem rules of the American Railway Association and the interchange rules of the Master Car Builders' Association. These rules were entirely suspended or substantially modified during the period of federal control. The car service rules prescribe the manner of joint use; the per diem rules fix the rate of daily rental; and the Master Car Builders' code defines the responsibility for repairs. We are particularly interested in the question of repairs. In brief, the code holds the car owner responsible for repairs made necessary by ordinary wear and tear in service both when the car is at home or on another road. The user of the car is held responsible for repairs made necessary by "unfair" usage, such as that caused by train accidents. The light running repairs required to make good broken or missing parts are made by the road which has the car, when the need of such repairs becomes apparent. The cost of making good ordinary wear and tear is charged to the owner; the cost of repairs occasioned by rough usage is charged to the road responsible for the damage. In the course of time, usually every two or three years, the cumulative effect of wear and tear and accidental damage necessitates a general overhauling of the car. In normal times this is commonly done by the owning road when the car is at home. When a car is on a line other than the owning line the repairs are confined ordinarily to those required to put the car in condition to be sent home in service. The using road naturally restricts its work on cars of other companies to that which is necessary to keep the car in condition for day to day service. This means that the typical road takes care of the running repairs of both its own cars and those of other roads while on its rails, and confines the heavy general repair work to its own cars. Prior to federal control the typical road had about 60 per cent of its cars at home and 40 per cent were on other lines.

---

[16] From evidence prepared by Bureau of Railway Economics for presentation before Senate Committee on Interstate Commerce in hearings on Senate Resolution 23, June 15, 1921.

During federal control the principles of unification were applied in a degree which with respect to freight cars caused a virtual disregard of ownership. Under the instructions no distinction was to be made between "home" and "foreign" cars in making repairs. In theory each road was required to regard every car as its own car and to make the needed repairs, both light and general, to the limit of its capacity. In the distribution of cars little effort was made to return them to the owning road. Consequently the percentage of "home" cars on "home" roads was reduced from 60 per cent to from 10 to 20 per cent.

If the instructions which required each road to assume responsibility for the general repairs of all cars on its lines could have been carried out the results would have been more satisfactory. But as each road had difficulty in obtaining labor and materials, it was natural that the heavy repairs were devoted principally to the few home cars that happened to be at home and the work on foreign cars was confined to running repairs or patch work which merely kept the car in condition for day to day service. As the heavier work was neglected it was inevitable that the general condition of cars should suffer. It was inevitable also that the larger proportion of patch work or temporary repairs substituted for the thorogoing general repairs which would have been given by the owners in normal times meant that the total expenditures would not bear the usual relation to the general condition of maintenance. And in addition to this factor, which explains in greater part why freight cars were returned in inferior condition notwithstanding the expenditure of more than twice the maintenance cost of the test period, there was the factor of relative efficiency of labor. The restrictive rules of the national agreements and the much larger percentage of inexperienced employees had the effect of increasing expenses without increasing output.[17]

V. Additions and Betterments

The inability of the railroads in 1917 to finance additions to and improvements in facilities and equipment was one of the important reasons for federal control. The Federal Control Act appropriated $500,000,000 as a revolving fund to be used to pay the expenses of the Railroad Administration and to finance additional facilities or equipment required for government operation. The Act provided that these additions and betterments could be ordered when "necessary or desirable for war purposes or in the public interest on or in connection with the property of any carrier." Advances could be made from the revolving fund for all or any part of the expense of such additions or improvements, such advances to be charged against the carrier, to bear interest, and to be repaid so that the government would be fully reimbursed in the final settlement. As an offset to the interest charges on such advances, the Director General was required by the contract to pay interest to the company upon the cost of such work from the date of its completion, in addition to the guaranteed rental. A distinction was made between work required solely for war purposes and therefore of no permanent value to the company, and work which would inure to the permanent benefit of the company. The cost of work required solely for war purposes was to be assumed by the government. Tracks or other facilities at military camps are examples.[18]

---

[17] The factor last mentioned was a main point of difference between the Director General and the railroad companies in coming to an agreement on the terms of the final settlement. It is unnecessary to pursue the point further here. It was in controversy also in connection with the guarantee paid by the government during the first six months under the operation of the Transportation Act of 1920 (March 1 to September 1, 1920). The Interstate Commerce Commission recently decided that the relative efficiency of labor should not be considered in the settlement.

Relatively little improvement work was in progress when federal control began. That which was under way was continued pending the determination of a policy. A policy was finally announced in General Order 12, dated March 12, 1918. The order provided that improvements and additions should be confined to those which were absolutely necessary for the protection and development of transportation facilities required to meet the then present and prospective needs of the country's business under war conditions. Railroad officers were reminded that projects which might be regarded as meritorious and necessary from the separate viewpoint of a particular road might not be equally meritorious or necessary under government operation while the facilities of all roads were available for common use. The order specified that the construction of new lines or branches or the extension of existing lines should not be undertaken without the approval of the Director General. The same restriction applied to the ordering or construction of new locomotives and cars. Work under way prior to federal control or new work in harmony with the policy outlined above could be continued or undertaken when the capital charges for any one project would not exceed $25,000. All projects to cost in excess of $25,000 were to be referred to the Director General for approval.

During the year 1918 the Administration authorized betterment work which was estimated to require a total charge of over $900,000,000 to capital account. Of this amount $592,000,000 was actually expended. After the signing of the armistice, and when it was apparent that

---

[18] Claims against the government on this account may aggregate $200,000,000. Letter of Director General Davis to House Committee on Appropriations, May 5, 1921.

Congress would tighten up on appropriations for the revolving fund, the program for new work was curtailed. The limit of $25,000 allowable without prior approval was reduced to $1,000. The total authorizations for the capital accounts proportion of betterment work in 1919 were less than one-third of those authorized in 1918. A substantial part of the work begun in 1918, however, was continued, so that the actual charges in 1919 against capital account were $571,000,000. Including similar expenditures made in January and February, 1920, which were about $37,000,000, the total charges to capital account during the entire period of federal control were $1,200,000,000. The details are listed below:

CAPITAL EXPENDITURES DURING FEDERAL CONTROL [19]

Item	1918	1919	Two years
Roadway and track........	$294,000,000	$247,000,000	$541,000,000
Improvements to existing equipment..............	19,000,000	21,000,000	40,000,000
New equipment purchased by R. R................	161,000,000	64,000,000	225,000,000
New equipment purchased by R. R. Admin.........	118,000,000	239,000,000	357,000,000
Total 1918 and 1919 ...	$592,000,000	$571,000,000	$1,163,000,000
Estimated expenditures in January and February, 1920			37,000,000
Grand total................................			$1,200,000,000

In referring these figures in his final report, dated February 25, 1920, Director General Hines states:

> During a considerable period immediately preceding Federal control, the railroad companies had cut down the amount of their expenditures for additions and betterments and equipment because of the high prices, difficulty in obtaining deliveries, absence of funds, etc. The Railroad Administration was, of course, not able to make any plans whatever with respect to a program of capital expenditures for either way and structures or equipment for the calendar year

---

[19] Report to President by Director General for fourteen months ended March 1, 1920.

1920; and it is understood that comparatively little has been done in that direction up to the present time by the railroad companies. The result is that at this time very large expenditures are called for on the railroads in the public interests to increase their efficiency and enable them to meet the growing demands for transportation. Unless the railroad companies shall be able to adopt and enforce the important unifications of facilities and equipment and control in the common interest of the handling of the business in times of stress, the available facilities and equipment will turn out to be wholly unequal to the requirements of the public. Even with substantial continuance of all the important methods of unification and common control, the necessity for very large capital expenditures, both of way and structures and for new equipment, will be very great.

VI. Financial Results of the Entire Period of Federal Control

The financial results of the year 1919 were much more unfavorable than those of 1918. The deficit in 1918 was approximately $245,000,000. For the entire period of federal control, January 1, 1918 to March 1, 1920, the deficit is at least $1,200,000,000. This is the estimate given by Director General Davis (the present incumbent) in his letter of May 5, 1921, to the Chairman of the Committee on Appropriations of the House of Representatives. In April, 1920, shortly after the close of federal control Director General Hines stated that the deficit would be about $900,000,000. This figure, however, failed to include many items which the present Director General has taken into account in his higher estimate. It is quite probable that the final sum will be substantially in excess of Mr. Davis' estimate of $1,200,000,000, if the railroad companies are successful in obtaining recognition of even a small part of the claims which are now pending. In his letter above referred to, Mr. Davis estimates that the claims for undermaintenance alone will probably run from $700,000,000 and $800,000,000, and he adds that "the Railroad Administration records fail to support claims for overmaintenance sufficient in amout to offset these amounts, and it is quite evident that some allowance must be made on account of undermaintenance." Up to May 1, 1921, final settlements had been made with but 19 of the 161 Class I roads, and with but 28 out of a total of 284 of the smaller roads and terminal and switching companies. The delay in settlement is mainly the result of differences in viewpoint on the one factor of maintenance and the time taken to prepare the vast amount of accounting detail required by the Administration, or furnished by the railroad companies on their own initiative, in support of their claims.

The details of the estimated deficit of $1,200,000,000 are not available to the writer but some light on individual items may be had from the final report of the Division of Finance, which gave the estimated deficit as $900,478,757. The report is dated May 10, 1920, and gives the following analysis of the Profit and Loss account as of February 29, 1920, when the roads were returned to private operation:

ANALYSIS OF PROFIT AND LOSS ACCOUNT

Estimated excess of operating expenses and rentals over operating revenues:		
Class 1 railroads	$677,513,152	
Other privately owned properties	43,011,129	
Inland waterways	2,449,739	
Total	$722,974,020	
Expense of central and regional organization	13,954,980	
Deficit, American Railway Express Company	38,111,742	
Adjustment of materials and supplies	85,204,618	
Net interest accruals	37,558,162	
Non-operating income	....	$12,336,855
Deductions from gross income	10,118,034	
Miscellaneous profit and loss items	4,894,056	
Profit and loss debit balance	....	900,478,757
Total	$912,815,612	$912,815,612

In analyzing the causes of the deficit under federal control, Director General Hines in his final report and in other public statements called attention to certain features which he believed should be given consideration. These features may be summarized as follows:

(1) It was not practicable to increase rates immediately when federal control began. The general increases in freight and passenger rates were made effective in June, 1918. The first general increase in wage rates, while announced in May, 1918, was made retroactive to January 1.

(2) During the first six months of 1919 there was an extraordinary slump in traffic.

(3) The coal strike in November and December, 1919, seriously affected revenues, and operating expenses were increased by the higher price of fuel.

Mr. Hines stated that the net operating income of 1918 would have been $494,000,000 greater if it had been practicable to increase rates on January 1, 1918, in the same degree that they were advanced in June. This additional revenue would have brought a surplus of nearly $250,000,000 in 1918, instead of a deficit of an approximately equal amount.

In referring to the disappointing results of 1919, Mr. Hines intimates that the serious decline in business during the first half of the year accounts for practically all of the deficit of $292,500,000 in that period. To the coal strike he attributed the deficit of $114,000,000 in November and December, 1919. He called attention also to the fact that the Federal Control Act required the government to assume two-fifths of the annual standard return as the rental for January and February, 1920, altho the earning capacity in those two months is lower than the average for the year. In the test period the January and February proportions of the yearly railway operating income ware 6.228 per cent and 5.257 per cent respectively, a total of 11.485 per cent for the two months, whereas the "pro rata for each fractional part of a year of federal control" (required by the Federal Control Act) obligated the Administration to pay 16.667 per cent of the annual rentals. This method of accounting added approximately $49,000,000 to the deficit for January and February, 1920.

It is proper, of course, to give due consideration to all of these adverse factors. At the same time it must be remembered that scarcely any period in railroad operation is free from similar factors which affect net income. The so-called "outlaw strikes" in 1920, for example, account for the larger part of the deficit during the first six months of resumed private operation while the government guarantee was continued.

Mr. Hines quite properly objects to the deficit during the twenty-six months being labeled as the "cost" of federal operation. As was pointed out in reviewing the financial results of the first period of government control, the deficit in that period could have been avoided if the increase in freight and passenger rates had been greater. The larger deficit of the second period could similarly have been met if Mr. Hines had considered it expedient to initiate further rate increases during his régime. As it stands, the loss is borne by the public treasury.

If private operation of railroads had continued during the war, the railroads would have had to assume increases in expenses approximately as great as those assumed by the government. Tho it is probable that the restrictive rules of the national agreements would not have been adopted, a wage scale lower than that of the Railroad Administration could hardly have been maintained without intolerable interference with the movement of troops and war supplies. True, the railroads were turned back with diminished earning power; but it is extremely doubtful whether the security holders would have been in any better position on March 1, 1920, if private operation had continued throughout the war.

VII. How Far the Policy of Unification Has Proved Permanent

It is not practicable to make a satisfactory appraisal of the economies made possible through the unification policies of the Railroad Administration. These economies were entirely obscured or were offset in whole or in part by other factors which had an overpowering influence upon operating expenses. Among the adverse factors the two of greatest effect were (1) the necessity during the first year of giving primary attention to war-time transportation needs and but secondary consideration to operating costs, and (2) the lower efficiency of labor, especially among the employees with whom the national agreements were made. Further to be considered are the general advances in all wage rates, the general adoption of the eight-hour day in all branches of the service, the greater costs of materials, and the highly unsettled business conditions. Unfortunately there is no known device which if applied to the operating results of the test periods would bring definite results from which the single factor of unification of facilities and equipment could be measured with any approximation of accuracy. The estimates which appear in the annual reports of the Administration are to be viewed with caution, as they tell but part of the story. Undoubtedly the common use of terminals and other facilities by roads which are normally in competition resulted in savings in operating costs. These, however, under the non-competitive conditions of federal control, were not as important as was the increased capacity which such consolidations made possible when the railroad machine was taxed to its utmost by the demands of war transportation. During the year 1918 the unification policies and the centralized control, backed by patriotic coöperation from the whole organization, made it possible to produce a volume of transportation greater than that produced in 1917 (when all previous records had been broken) and to move the traffic with less congestion and delay. It should be noted, however, that in 1920, particularly during the second half of the year, when the railroads were again under private operation and when the policies of the Railroad Administration were not in effect, the volume of traffic exceeded even that of 1918, and it was moved with a freedom from congestion and delay that compares favorably with the record of the best months of the federal control period.

Since the termination of federal control many of the unification policies of the Railroad Administration have been materially modified or have been entirely abandoned. Many were applicable only to a period in which competition in service was eliminated. The absence of competition in service during federal control was distasteful to the shipping and the traveling public. The prospect of a renewal of competition under the initiative of private operation was one of the most important reasons for the unanimity of the demand on the part of the public for a return to pre-war conditions of transportation service.

For a considerable period before the war, with uniformity of rates and charges, competition had been confined almost entirely to service. The soliciting forces of competing lines emphasized the superiority of their terminals or the regularity and expedition of their train service. The road which had shown foresight in locating its terminals advantageously, or had foregone a part of its dividends over a series of years so as to improve its facilities and equipment, made the most of these favorable factors in its traffic-soliciting efforts. The road which had inadequate or less accessible terminals, or was otherwise meagerly equipped, was forced to excel in other features of service. In other words, the spur of competition was a helpful tonic which reacted to the benefit of public service.

During federal control, with virtual pooling of facilities wherever practicable, and with complete elimination of competition, the terminals and other facilities of the prudent road were used in common by other roads which had been unable or unwilling to improve their facilities and equipment. Naturally, with the return of competitive conditions of private management the well-managed roads are disinclined to share their advantages with competitors. The year 1920 consequently has witnessed a general reversion to the pre-war status and the abandonment of most of the innovations of the Railroad Administration. A few instances of unification still remain, such as the joint use of the Pennsylvania passenger terminal in New York by the Pennsylvania and the Baltimore & Ohio Railroads. The Transportation Act of 1920 empowers the Interstate Commerce Commission to require the joint or common use of terminals, including main tracks for a reasonable distance outside of the terminals, when such a requirement is believed by the Commission to be in the interest of public service. As yet the Commission has not formally exercised that power. Probably it will not be invoked until the Commission has worked out its recommendations for the voluntary consolidations provided for in the Act.

Joint use of locomotives has not been continued, altho in some cases during the heavy traffic period of 1920 roads with surplus power rented locomotives to roads which were short. As to freight cars, the per diem rules agreement, the car service rules, and the interchange code of the Master Car Builders' Association have been readopted substantially as they were before federal control. The per diem rate for the use of freight cars has been increased from 60 cents to $1 and the car service rules have been amended in certain particulars, but these amendments do not affect the individuality of ownership and control under normal conditions. The Interstate Commerce Commission, however, has been given greater power (under the Transportation Act) to control the distribution of cars and locomotives when conditions justify the exercise of that power. A Commission on Car Service has been created as a branch of the American Railway Association and has been clothed with certain administrative powers of policing the railroads to see that the car service rules are properly observed.

There is little likelihood that the Railroad Administration standards for locomotives and freight cars will be continued as such, but probably there will hereafter be a closer approximation to uniformity in certain features of design and appurtenances. The individual roads are reverting to the former practice of designing locomotives and freight cars to suit their local needs. The ultimate result will probably be to reduce the number of types of peculiarly local design, and in freight cars particularly there will be further progress toward standardization.

All of the accounting short cuts used by the Railroad

Administration in dividing joint revenues and expenses have been abandoned. The plan for standardizing operating statistics, however, has been perpetuated by the Interstate Commerce Commission. During the year 1920 this plan was continued by the Commission without change; but effective on January 1, 1921, certain modifications were made at the request of the railroad executives with a view to reducing the clerical work required by the original plan.

The right of the shipper under Section 15 of the Act to Regulate Commerce to specify the route over which his shipment should be carried has been restored, but the Interstate Commerce Commission is authorized by the Transportation Act of 1920 to order changes in the routing of traffic when in its opinion a road is unable so to transport the traffic offered to it as properly to serve the public.

Prior to the date of the termination of federal control the railroad companies took steps to reorganize the "off line" soliciting agencies which had been abolished by Director General McAdoo, and on March 1, 1920, or shortly thereafter, practically all of these agencies were again functioning. In discussing this subject in the preceding review of the first year of federal control attention was drawn to the fact that the public did not take kindly to this abridgment in service.

A few of the consolidated ticket offices have been continued. In some cities certain of the roads have withdrawn but the joint offices are being used by the remaining roads. In Chicago, for example, three roads withdrew while nineteen remained. In most cases where the offices were broken up, or where some of the roads withdrew, the action was taken because certain of the roads believed that the joint offices worked against their individual interests under competitive conditions.

Undoubtedly the consolidated ticket office tended to throw a greater number of passengers to the strong lines and correspondingly to reduce the passenger traffic of the weaker roads.

The policy of reducing or eliminating duplicate passenger train service, such as that between Chicago, St. Louis, Omaha, and the Twin Cities was quickly abandoned. With the return to former conditions of competition it was but natural that the service should be restored substantially on a pre-war basis.[20]

The efforts of the Railroad Administration to centralize the purchasing of equipment, rails, ties and other materials and supplies never produced satisfactory results. The Administration itself abridged the scope of the plan in 1919, and it died at the end of federal control.

Advertising for traffic purposes was entirely discontinued during the first year of federal control but was resumed to a limited extent in 1919 with a view of stimulating passenger travel. In 1920, under private operation, advertising was resumed on the former scale.

The permit system for controlling traffic at the source, a plan which had much to do with the prevention of congestion during federal control, has been continued in part, particularly in the field of export traffic. Shipments for export are not accepted unless the shipper can give assurance that ship space will be available at seaboard. The plan works well in preventing an accumulation of cars at water terminals.

On the whole it may be said that nearly all of the innovations of the Railroad Administration were effective only under the non-competitive conditions of federal

---

20. During the year 1919 the Railroad Administration restored a large part of the passenger train mileage taken off in 1918. Out of the 67,290,482 train miles (per annum) discontinued in 1918, the Administration restored 11,461,758 (per annum) up to June 30, 1919. The reëstablished service included some of the limited trains, such as the Broadway Limited of the Pennsylvania Railroad between New York and Chicago.

control. Most of these innovations brought satisfactory results while the war was in progress, especially in increasing traffic capacity. Most of them worked less satisfactorily in 1919 when the return of the roads to competitive conditions was in sight. Under the free play competition the principles of unification have a much restricted application and in the majority of cases they are not regarded with favor either by the railroads or the public.

VIII. CONCLUSION

The main purpose of this article and that preceding has been to outline the events and conditions prior to federal control, to describe the organization and methods of the United States Railroad Administration, and to appraise the results. In concluding our review we may ask several questions which usually have a prominent part in any discussion of nationalization as a possible solution of the railway problem.

The first has to do with labor relations: did government management show a tendency to make undue concessions to labor for political or partisan ends? Here it is difficult to distinguish between policies and actions dictated solely by emergency needs and those which in some degree may have been inspired by political motives. The Administration was committed by the President to a definite policy of keeping labor contented. Under this policy it was necessary to grant wage rates and to concede working rules which under other conditions might be regarded as unreasonably favorable to organized labor. The main purpose of this sympathetic attitude of the Administration toward the aspirations of the leaders of railroad labor was undoubtedly to prevent disputes which would adversely affect transportation service during the war period and thus bring discredit upon federal management. At the same time it was perfectly natural that the Administration, with an eye to its perpetuation, would on the one hand do everything that properly could be done to foster friendly relations with labor, and on the other hand would avoid doing anything which would antagonize the labor vote. On the whole, it is the writer's opinion that political motives did not have a dominating influence in labor relations. While there is much to support the view of many observers that the Administration did truckle to labor, there is little evidence that this policy was designed to serve political or partisan ends.

The second question is this: was government management used to promote the political fortunes of the party or a party leader? Here again there is difficulty in differentiating between motives. The goal of the Administration was to surpass all records in transportation efficiency. A successful result would be to add directly to the effectiveness of our participation in the world war and to shorten its duration. Indirectly too, it would add to the prestige of the political party and the leaders then in power. While there were indications here and there that the Administration was not unmindful of the political fortunes of the party or its leaders, these considerations were kept in the background and had little or no effect on general policies. As a sidelight on this question, it is pertinent to call attention to the fact that political considerations had nothing whatever to do with the selection of the officers or employees of the Administration. The men were chosen solely on the ground of fitness. No questions were asked as to political affiliations. It was peculiarly a case where the office sought the man.

The third question has to do with the published statements pertaining to transportation achievements and financial results. Was there any tendency to color the operating statistics or to adjust or manipulate the figures in order to improve the showing? Was there any tendency to refrain from facing the real financial situation or to put off the day of reckoning?

So far as the statistics of physical operation were concerned, the Administration's policy was one of publishing and distributing the complete figures month by month in much greater detail than had ever before been attempted. Nothing was held back. The same is true as to the statements of financial results, with the one exception that during the closing months of the federal control period there was a disposition to minimize the extent of the actual deficit by ignoring the element of undermaintenance and other claims against the government. During Mr. McAdoo's term of office there was a disposition to magnify the extent of savings made possible through unified control, and in the latter part of Mr. Hines' term of office there was a tendency to overdo in "explaining away" certain unfavorable features. It was natural enough that the Administration should desire to place the situation before the public in the best possible light. At times the coloring was carried to extremes, but there cannot be the slightest suspicion of deliberate manipulation with intent to deceive.

The fourth question bears upon rates and service. Did the railroad administration adjust or manipulate rates under pressure from individuals and localities, or improperly discriminate in rates or service against individuals or localities? It may be stated with assurance that no such improper discrimination was practiced. Exception might be taken here and there in specific cases, as, for example, to the rate adjustments which favored the Southern ports at the expense of North

Atlantic ports; but the consensus of opinion of disinterested traffic experts is that the Administration's action in that and in other cases was justified from the national viewpoint. On the whole, it is the writer's opinion that an honest effort was made in all adjustments and changes to treat individuals and localities fairly without regard to political effect.

Finally, we may ask ourselves whether our recent experiment in federal control affords an adequate test of the desirability of a permanent policy of public ownership and management. The answer is plainly in the negative. The results in 1918 were favorable. In 1919 they were unfavorable. They were favorable in 1918 because at that time we were actively engaged in war, every influence of patriotism supported the Railroad Administration, and the organization was held at concert pitch by the critical military needs. The unfavorable results in 1919 may be attributed in greater part to the pronounced reaction from war-time strain, to the serious decline in traffic, and to the disintegration of the organization in a too prolonged closing period. No one should question the expediency of the government's action in taking the railroads in the emergency. The centralization of power and the more effective coördination with other branches of the government in the crisis made possible results in the effective utilization of equipment and facilities which would have been much more difficult under private management. But it is not proper to treat that part of the period as the test of what might be expected under normal conditions. As regards the unfavorable year 1919, it would be as unfair to make that a test of government operation as it would be to take the present period of subnormal traffic and disturbed economic conditions as the final test of private management.

Those who advocate nationalization and look upon the results of both years as favorable to government operation must concede that they are to be credited to railroad men who rose to the emergency. The proponents of nationalization who are disappointed in the results of the two years attribute the failures to the fact that the real management during the greater part of federal control was in the hands of men who were brought up under private management and who, therefore, could not or would not avail themselves of the advantages of unification.

It is plain, therefore, that nothing definite can be proved from the results of 1918–19. A real test of government operation is possible only if carried on over a longer period — one in which business conditions are normal and in which political expediency would have normal play. The period under review was so abnormal that the results are valueless as guides to what might be expected from similar control or complete government ownership when normal conditions return.

WILLIAM J. CUNNINGHAM.

HARVARD UNIVERSITY.

THE TECHNOLOGICAL INTERPRETATION OF HISTORY

SUMMARY

I. Marx's view of history is technological not economic. — II. The social process according to Marx, 75. — III. Technological changes, the class struggle and human adjustments to environment, 75. — IV. Forces lying back of technological evolution, according to Marx and Engels: extension of markets, development of science, cosmic evolution, 78. — V. The Marxian view against the background of fundamental factors and forces, 80. — VI. Criticism of the Marxian theory, 82. — VII. Conclusion, 83.

I

It has become the fashion of late to refer to the Marxian interpretation of history as an "economic" interpretation, and to drop the term "materialist" used by Marx and Engels. Indeed one recent writer goes so far as to say that "there is no logical connection either way between philosophic materialism and what is called the 'materialistic conception of history.' . . . Economic causes operate through men's desire for possessions, and would be supreme, even if desire could not, from a philosophic point of view, be explained in materialistic terms."[1] Thus this so-called economic interpretation becomes at last a psychological interpretation.

Marx and Engels, however, use the term "materialist" in describing their theory. While the writer believes, for reasons that will become apparent later, that this term describes their view more accurately than the term "economic," nevertheless it must be conceded that it is open to criticism on the ground that it is too broad. There are various materialist interpretations of history — geographic, climatic, and technological. The Marxian interpretation, however, is technological.

---

[1] Bertrand Russell, "Bolshevik Theory," New Republic, September 15, 1920.

The special theory of Marx can best be set forth by quotations from his writings: "It is not the articles made, but *how they are made*, and *by what instruments*, that enables us to distinguish different historical epochs. *Instruments of labor* not only supply a standard of the degree of development to which human labor has attained, but they are also indicators of the social conditions under which that labor is carried on."[2] Speaking of the "*technological* comparison of different epochs of production" he says: "However little our written histories up to this time notice the development of *material production*, which is the basis of all social life, and therefore of all real history, yet prehistoric times have been classified in accordance with the results not of so-called historical, but of materialistic investigation. These periods have been divided, to correspond with the *materials from which their implements and weapons are made*, viz., into the stone, the bronze, and the iron ages."[2] From Engels we have the following: ". . . the whole of history up to the present time is to be regarded as the history of the period extending from the time of the practical discovery of the transformation of mechanical movement into heat to that of the transformation of heat into mechanical movement."[3] Clearly this is technology and not economics.

Marx, it is true, does refer to the economic structure of society as the foundation on which rise legal and political superstructures. But at the base of the economic structure of society he never allows us to lose sight of the foundation stones of technology. The economic structure is referred to as "relations of production"; the technological foundation underlying the economic structure is referred to as "methods of production" and "material forces of production." "In the social production which men carry on they enter into definite *relations* that are indispensable and independent of their will; these *relations of production* constitute the economic structure of society — the real foundation, on which rise legal and political superstructures and to which correspond definite forms of social consciousness. The *mode of production* in material life determines the general character of the social, political and spiritual processes of life. . . . At a certain stage of their development the *material forces of production* in society come in conflict with the existing *relations of production*. . . . New higher *relations of production* never appear before the *material conditions* of their existence have matured in the womb of society. . . . In broad outlines we can designate the Asiatic, the ancient, the feudal, and the modern bourgeois *methods of production* as so many epochs in the progress of the *economic formation* of society." [4]

---

[2] Capital, Kerr edition, vol. i, p. 200.

[3] Engels, Landmarks of Scientific Socialism, translated by Lewis, Kerr edition, pp. 148, 149.

From these quotations it must be clear that, while Marx looks upon the economic structure of society as the basis for the political and intellectual superstructure, he finds the foundation upon which the economic structure is built in technology, in the mechanical modes of production. He distinguishes, in short, between the economic basis of society and the technological basis of society.

---

[4] Marx, Critique of Political Economy, translation by Stone, pp. 11–13.

II

There are then according to Marx three distinct steps in the social process: (1) changes in the technique of production; (2) changes in the economic structure of society — in the "relations of production," the "property relations" (such as free competition, freedom of enterprise, private property on the one hand; or monopoly, public regulation, public ownership and coöperation on the other); (3) changes in political, social and intellectual institutions. Changes in technique necessarily alter the economic structure of society, which in turn affects government, social institutions, and the controlling ideas of the age.

With Marx, then, the foundation upon which any society is built is the technique of production and transportation. Industrial society is conditioned by this technique. The economic structure of society is the adjustment that human beings in all their economic interrelations have made to the conditions imposed by technology. Political interrelations in turn must conform to the economic structure of society. So also with other social institutions. Thus the superstructure is reared on the basis of the economic structure, which in turn rests on the technique of production. "Man makes his own history, but he does not make it out of whole cloth, he does not make it out of conditions chosen by himself, but out of such as he finds close at hand." [5]

III

Engels' statement of the theory differs somewhat from that of Marx, but he agrees in his emphasis on the technological basis of society. He defines "historical materialism" as "that view of the course of history which seeks the ultimate cause and the great moving power of all important historic events in the economic development of society, in the changes in the *modes of production and exchange*, in the consequent division of society into distinct classes, and in the struggle of these classes against one another."[6] "From this point of view the final causes of all social changes and political revolutions are to be sought, not in men's brains, not in man's better insight into eternal truth and justice, but in the *changes in the modes of production and exchange*. . . . From this it also follows that the means of getting rid of the incongruities that have been brought to light must also be present, in a more or less developed condition, within the changed *modes of production* themselves. These means are not to be invented by deduction from fundamental principles, but are to be discovered in the stubborn facts of the existing *system of production*."[7]

---

[5] Marx, The Eighteenth Brumaire, translated by DeLeon, p. 9.

Engels' statement of the theory may be summarized as follows: (1) changes in the modes of production and exchange; (2) the consequent formation of new class alignments; (3) class conflicts growing out of this new alignment; (4) reconstruction of economic, social, political and intellectual institutions.

The fundamental difference between the Engels' version and the Marxian lies in the emphasis that Engels places on class alignments and class conflicts. In his introduction to the Communist Manifesto he tells us that "the whole history of mankind has been a history of class struggles." Marx places the matter on a broader basis. With him the technical changes in the modes of production necessitate new human and social adjustments to the changed technological environment. True, so far as changes in the economic and political institutions of society are concerned, such adjustments constitute an effort on the part of society as a whole to come to terms with the new technological conditions. And since any adjustment on the part of society as a whole to new situations involves injury and suffering for some groups, and benefit and progress for others, the necessary result is a struggle arising out of opposing class interests. All adjustments involving social interrelations must result in conflict. But many adjustments do not involve complex interrelations. For example take Marx's discussion of the effect of capitalism on parental exploitation of children. Marx tells us that "it was the capitalistic mode of exploitation which, by sweeping away the economical basis of parental authority, made its exercise degenerate into a mischievous misuse of power."[8] Clearly the class struggle had no part in the adjustment of family conditions to the factory system of production. Another example would be the effect of modern industrialism on Sunday observance and religious belief. On the other hand Marx points out that a person's intellectual outlook and ideals, tho the individual himself may be unaware of it, are frequently a product of class antagonisms based on a clash of economic interests. "Upon the several forms of property, upon the social conditions of existence, a whole superstructure is reared of various and peculiarly shaped feelings, illusions, habits of thought and conceptions of life. The whole class produces and shapes these out of its material foundation and out of the corresponding social conditions. The individual units to whom they flow through tradition and education, may fancy that they constitute the true reasons for and premises of his conduct."[9]

---

[6] Engels, Socialism, Utopian and Scientific, Kerr edition, p. 23.

[7] Ibid., pp. 94, 95.

---

8. Capital, Kerr edition, vol. i, p. 536.

9. Marx, The Eighteenth Brumaire, translated by DeLeon, p. 48.

IV

Social dynamics then go back ultimately, according to Marx and Engels, to changes in the modes of production. But, one may ask, what brings about these changes in the modes of production? In the Communist Manifesto, Marx and Engels sought to explain how changes in the modes of production brought on the downfall of feudalism. What brought on these changes in technique which felled feudalism? It was the widening of the market. "The East Indian and Chinese markets, the colonization of America, trade with the colonies, the increase in the means of exchange and in commodities generally, gave to commerce, to navigation, to industry an impetus never before known. . . . The feudal system of industry, under which industrial production was monopolized by close guilds now no longer sufficed for the growing wants of the new markets. The manufacturing system took its place. . . . Meantime the markets kept ever growing, the demand ever rising. Even manufacturing no longer sufficed. Thereupon, steam and machinery revolutionized industrial production. The place of manufacture was taken by the giant, Modern Industry. . . ."

This still leaves us hanging in mid-air. What were the factors which brought on the widened market? The answer of the Communist Manifesto is: "The discovery of America, the rounding of the Cape. . . ." In short, the development of the science of navigation. And back of this scientific development lies the quest for treasure, land and livelihood. Engels expressed the causal relation as follows: "Although technique is mainly dependent on the condition of science, it is still more true that science depends on the condition and needs of technique. A technical want felt by society is more of an impetus to science than ten universities." [10] So Engels solved the riddle by arguing in a circle: technique depends on science, and science depends on technique. By implication, however, one would infer that possibly "ten universities," interested in research for its own sake, might contribute something to science independently of the impetus of the needs of technique.

But of course Marx and Engels did go back to more fundamental ultimates than those so far enumerated. They were philosophical materialists. They write: "It is impossible to separate thought from matter that thinks. This matter is the substratum of all changes going on in the world."[11] From Marx we have the following: "I was led by my studies to the conclusion that legal relations as well as forms of state could neither be understood by themselves, nor explained by the so-called general progress of the human mind, but that they are rooted in the material conditions of life. . . ."[12] One has only to read Engels' *Landmarks of Scientific Socialism* to realize that he seeks for ultimate causes in the forces inherent in cosmic evolution. Physical evolution is there surveyed in terms of Kant's nebular theory; organic evolution in terms of Darwinism.

Why then are changes in the modes of production and exchange referred to as the "ultimate cause" of historic events? Because Marx and Engels are trying to lay bare only the dynamics of human history. They are not seeking to discover causal relations in the universe as a whole. They are seeking to explain the social process. So far as human society goes they conceive that they have reached ultimate fundamentals when they have found the basis upon which social institutions rest. For them all social institutions are human adjustments to the prevailing technique of production. With the underlying causes for the changes in technique they are in the main not concerned. Whatever may be the reasons for these changes, all the institutions of society — economic, political, social, intellectual—are the results of the efforts of conscious, struggling human beings to adjust their social relations to their technical environment.

---

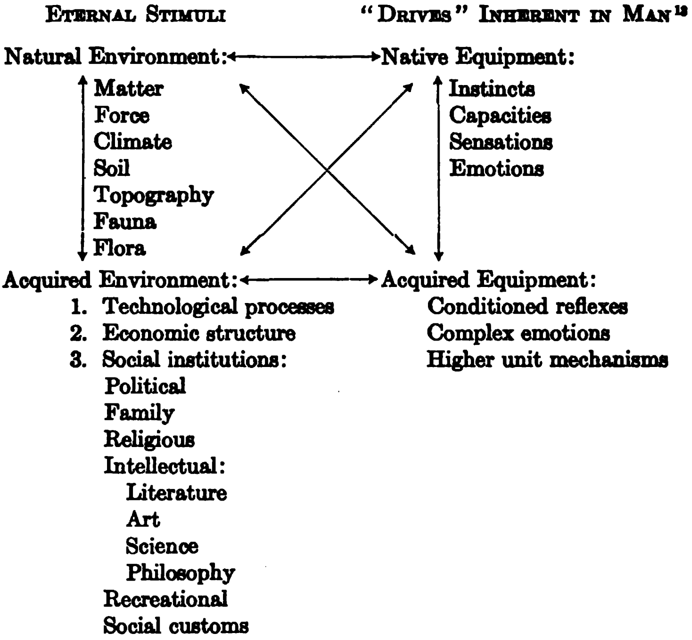
[10] Engels, letter of 1894 in Der Sozialistische Akademiker, quoted in Seligman, Economic Interpretation of History, p. 59.

[11] Marx and Engels, Die Heilige Familie, quoted in Engels, Socialism, Utopian and Scientific, Kerr edition, p. 16.

[12] Marx, Critique of Political Economy, translation by Stone, p. 11.

V

The accompanying diagram may help to place the Marxian theory against the broader background of fundamental factors and forces. We start with Man and Nature. Nature furnishes the natural environment



---

[13] Cf. Woodworth, Dynamic Psychology.

which acts selectively upon human heredity resulting in races of men equipped with native instincts and capacities, sensations and emotions adapted to the selective environment. The natural environment also offers stimuli, evoking responses in the native equipment of man. This native equipment has survived because it constitutes a workable adjustment to nature. Different adjustments might no doubt have been possible, but through the trial and error method of nature certain types of human equipments have survived. Nature thus affects Man. But this is quite a different thing from contending, as would philosophical materialism, that you can explain Man in terms of Nature.

It is not necessary to go into detail regarding the causal interrelations of native equipment, acquired equipment, natural environment and acquired environment. A little reflection will soon convince one that the causal relation works both ways between any one of them and each of the other three. For our purposes it is sufficient to point out that Marx and Engels were concerned only with an explanation of social institutions and the law of social dynamics. As philosophical materialists, it is true, they have always as a background for their thinking the imminent forces of cosmic evolution. These forces expressing themselves through Man and Nature bring on changes in the technique of production. These changes serve as their starting point in explaining history. For them there is but one active, dynamic institution in society — the technical modes of production. All other institutions of society are conceived as passive. They would never change were it not for changes in the modes of production. An analogy may be found in Fisher's equation of exchange. Fisher conceives of M and T as active, dynamic factors; V, M′, V′ and P are passive factors which change as M or T changes.

VI

Enough has been said to show the severe limitations of the Marxian theory. They may be summarized as follows:

1. The theory starts with changes in the technological processes. It does not reach back to the ultimate forces in life — the "drives" inherent in the native instincts and capacities, sensations and emotions, in the acquired equipment of man, and the "stimuli" afforded by the natural environment. Here are to be sought the real wellsprings of individual and social life.

2. The theory assumes that the one external condition to which man must make new adaptations in his social institutions is the technique of production. The assumption is not true. Changes in the natural environment, in climate and geography for example, profoundly alter the face of civilization, as Huntington has so ably shown. No doubt these changes work out their influence to a considerable extent through resulting changes in the modes of production, but not exclusively so.

3. The theory assumes that if no changes took place in the modes of production, social institutions would not change. The mere statement of this view of history shows how extremely mechanical it is. It completely overlooks the instinct of contrivance and invention, the constant effort of human beings through trial and error to find improved adaptations to their environment. Even tho man's environment never changed, social institutions would still change because of man's constant effort to find better adaptations to that environment.

4. The theory assumes that all social institutions are adaptations to external environment. It overlooks the fact that social institutions are also adaptations to the instincts, capacities and emotions inherent in man him-

self. Hence even tho no changes took place in the modes of production man would still seek to contrive superior forms of self-expression. Changes would thus take place, especially in religious, intellectual, and recreational institutions.

5. The theory assumes that but one single adaptation to given conditions is possible. "In the social production which men carry on they enter into definite relations that are *indispensable* and *independent of their will.*" Hence the dogma of the inevitableness of socialism. But in reality the whole history of man is an application of the method of trial and error. The very fact that we are constantly trying out various solutions, none of which are perfect, indicates that there is no one single solution.

VII

Human beings are phlegmatic. Tradition and inertia are strong. Social institutions change slowly, for the simple reason that any change must get the support of the existing dominant social forces, or else the balance of power must be shifted. Hence, as a rule, social institutions are not changed until some powerful force comes along to pry them loose. The Marxian theory is a brilliant recognition of this fact. In modern times at any rate technological changes are taking place with astonishing rapidity. New social adjustments must necessarily follow. Profound technological changes compel attention to economic problems.

Modern social dynamics cannot be understood without searching out the effect of technology on civilization. It is one thing, however, to search out the influence of a single factor, and quite a different thing to refuse to seek out the influence of other factors. A useful tool need not be made a dogma.

ALVIN H. HANSEN.

UNIVERSITY OF MINNESOTA.

A STATISTICAL TEST OF THE SUCCESS OF CONSOLIDATIONS

SUMMARY

Nature of the study, 84. — Underlying assumptions of the study, 86. — I. Previous earnings of the representative consolidation compared with actual earnings, 90. — II. Estimated earnings of the representative consolidation compared with actual earnings, 91. — III. First-year earnings of the representative consolidation compared with later earnings, 93. — Table of fundamental data, 95.

STATEMENTS concerning the advantages or disadvantages of large scale enterprises brought about through combination — the so-called "trusts" — are ordinarily based on certain theoretical assumptions. These *a priori* assumptions have emphasized the various economies and various wastes which are alleged to accompany consolidation. No attempt, however, has been made to apply specific and definable tests to a sufficiently large collection of actual cases to justify generalizations possessing empirical value.[1] To do this is the purpose of the present study. The consolidations here under review were for the most part organized before 1903. A period of at least ten years elapsed, therefore, between their organization and the economic disturbances caused by the Great War. The period affords ample opportunity to judge of the ultimate success or failure of the trusts, since in that time they should have been able to prove the economic advantages of consolidation.

---

[1] A preliminary study of this kind, using fewer corporations and less critical methods, was undertaken by me in another connection. See my Financial Policy of Corporations, vol. iii, p. 221.

The specific problem whether or not large combinations of units of production are successful is divisible into two parts: the definition of success and its specific application to the trusts. In order that our study may have an objective standard we must establish some clearly describable criterion of success; and we must be able to apply it to a sufficiently large group of trusts to give the results at least some semblance of inductive value.

The term success when applied to a business may mean a variety of things. A successful business may be one which is conducted so economically that the commodities it deals in reach the ultimate consumer at a low price relative to the competitive cost of production. It may be one that endures through a long period of time. It may be one that grows in mere size without reference to the relative yield to invested capital or to business ability. And finally it may mean — in fact usually does — a business that yields a relatively large profit to the managers. In the end all these usages are reducible to the last. A business cannot long produce or distribute commodities to the consumers at a relatively low price unless it yields a profit to its managers; it cannot long endure unless the activities of a manager are stimulated by liberal profits; it cannot increase in mere size unless the profit is sufficient to encourage the continuous investment of capital. It is difficult, however, to determine that amount of true profit or of return on invested capital which marks the line between success and failure. Both profit and success are relative terms. But they are relative to what?

In this study three separate standards of relative profit or relative success are used. I shall assume that an industrial combination, in order to be called successful, should yield a larger net profit than the sum of the net profits of the component elements that entered the combination. This is our first criterion. A second assumption will be that the combination should yield a net profit at least approximately equal to what its proponents, including its bankers, owners, and promoters, estimated that it would yield. And lastly it must be assumed that the average net earnings over a considerable period of time — say ten years — should show a conspicuous increase over the net earnings prior to the combination and during its first year. In other words, there must be a sustained increase. The application of these tests to industrial combinations in general is not as simple as their mere formulation. Something of a more or less arbitrary procedure has to be adopted, involving certain further assumptions. These will be explained in detail as we proceed.

A random selection of thirty-five industrial combinations was chosen which met the following six conditions. In order to qualify for the group the combination must (1) have been in existence at least ten years before 1914, (2) must have been formed as a combination of at least five separate, independent and competing plants, (3) must have a national rather than a mere sectional or local significance, (4) must have published financial reports in which at least some degree of confidence can be placed, (5) must have available published or accessible reports covering the earnings of the separate plants prior to their consolidation and the estimates of earnings made at the time the combination was effected. Lastly, the group as a whole must represent a wide diversity of industries.

A period of ten years was selected as sufficient to enable the "trust" to develop its weaknesses and its strengths; and cases were omitted from the tabulation when this period extended beyond 1914, since extraordinary profits or extraordinary losses due to the Great War might vitiate the calculation. Again, every effort was made to exclude from consideration all corporations not industrial combinations, strictly speaking. This was done by refusing to consider a business organization as an industrial consolidation unless it represented, at the time of its organization, at least five separate and relatively independent units, all previously competitors of each other. This eliminated from consideration large businesses arising from internal growth, with now and then a sporadic addition from the outside, and those businesses arising from the union of only two or three relatively large units. Such combinations should be considered business expansions rather than industrial consolidations. All purely local combinations having only a local market for their products and only a narrow and restricted market for their securities were left out of account. Furthermore, in order to be included in the group a corporation must have available reliable published reports, covering a period of ten years. These reports must be of such character that the annual earning statements can be reduced to something like a uniform basis.[2] Even with the published reports available it was difficult to standardize the accounts; the necessary assumptions and interpretations will be described under the appropriate headings. Lastly, considerable effort was made to obtain a wide distribution of corporations, in order to ensure representation of many different industries. Aside from the purpose to secure such a wide distribution no effort whatever was made to include corporations known to be either successful or unsuccessful — either those which have attained an investment standing or those which became bankrupt. It will be observed that the list includes some consolidations, like the United States Envelope Company, which have been conspicuous in their able management and their steadily maintained success, and some others, like the American Window Glass Company, which have been equally conspicuous failures. The majority of the corporations, however, are those reported to have attained a modicum of success.

---

[2] The American Window Glass Company — of which more will be said from time to time — is included notwthstanding the fact that its published reports are inadequate for our purpose. It was included in order that there should be at least one combination allied to the building trades.

In preparing the tables the most difficult problem was that of reducing the statements of the different corporations to a uniform basis. It was, in fact, the problem of establishing a uniform system for the accounting of net profits. Owing to the meager data ordinarily furnished by the different corporations, especially those obviously unsuccessful, results were obtainable only by using a large amount of guessing. The statements of the previous earnings were, almost invariably, taken from the published reports of accountants, chosen in the majority of cases by the bankers who underwrote the original security issues at the time of promotion. All estimates or predictions of earnings were, except in the cases explained in footnotes, taken from published statements issued by the bankers or the promoters at the time of promotion. Where more than one prediction was made, the lowest and least extravagant statement was used. A few instances were found of estimates of earnings so extravagant and unreasonable that one is reminded of Johnson's phrase about wealth beyond the dreams of avarice. Such cases were disregarded altogether, even tho they illustrate the extravagant expectations nurtured by some of the trust promotors. And the fact that the most extravagant predictions were often made in connection with consolidations which later proved utter failures, while not pertinent to the present study, is yet suggestive of the prevailing conception of profits expected through industrial consolidation. The earnings of the first year, as was true of the earnings for the later years, represent the net earnings after taxes and depreciation but before the payment of any interest or dividends. It was generally difficult and sometimes impossible to determine whether or not the ✓ company had charged its published net earnings with a reserve for depreciation. When no information of this character was available, the benefit of the doubt was given to the company; that is, it was assumed that the company made proper depreciation charges. In fact, in all cases of uncertainty in the computation of the net earnings the more liberal interpretation was adopted, so that the company was placed in the most advantageous light. The calculation of the average earnings for the first ten years presented no serious problem, except when the date of the beginning of the fiscal year was changed. In such cases the full twelve-month period was computed by a species of dead reckoning. Attention is called to the detailed descriptive notes, indicating the sources of figures and the method of compilation in cases involving some uncertainty. Where there is no reference the figures are taken directly from the annual reports of the corporation.

Table I gives the primary material on which all the others are based. Deductions from it will be discussed, in connection with the subsequent tables, under three headings: (1) the previous earnings of the separate plants before consolidation in comparison with the earnings after consolidation; (2) the estimated earnings at the time of consolidation in comparison with the earnings after consolidation; and (3) the earnings during the first year in comparison with the earnings during a period of years.

The figures in the tables that follow (Tables II to V) are in the nature of index numbers, being ratios expressed on a basis of 100 between the different figures for each of the thirty-five corporations. The medians of each group of thirty-five were computed from these ratios. Certain ratios could not be determined as real integers, because one of the terms was a negative quantity. Other ratios at the extremes of the arrays were very large. For these reasons an inclusive arithmetical average of the entire group of thirty-five ratios would be meaningless. Accordingly averages were computed of the twenty-one ratios lying between and including the quartiles. Owing to the relatively close dispersion in most cases on either side of the median these averages are perhaps more significant than the medians themselves. The closeness with which they approximate the medians should be noted in estimating the statistical value of the general conclusions.

I. Previous Earnings before Consolidation Compared with the Actual Earnings Realized

✓ From Table II it will be observed that the aggregate earnings of the separate competing establishments prior to consolidation were seven-tenths of the earnings estimated to follow consolidation. Roughly, the promotors of the consolidations believed that the mere act of combination would increase the earnings by about a half. But in actual results the earnings before the consolidation were nearly a fifth *greater* (18%) than the earnings of the first year after consolidation. (See also Table V.) The promotors expected the earnings to be a half greater than the aggregate of the competing plants; instead they were about a fifth less. Nor were the sustained earnings an improvement, for the earnings before the consolidation were between a fifth and a sixth greater than the average for the ten years following the consolidation. In brief, the earnings of the separate plants before consolidation were greater than the earnings of the same plants after consolidation.

II. ESTIMATED EARNINGS AT TIME OF CONSOLIDATION COMPARED WITH THE ACTUAL EARNINGS REALIZED

(See Tables III and IV)

The estimated probable earnings made by the promotors at the time the trusts were organized can be reached by two lines of evidence — the prophecies of the promotors themselves and the patterns according to which they cut the financial plans of the embryo corporations. The former we can consider the direct line of evidence, the latter the indirect line.

When we compare the estimates of the promotors covering the earnings of the new corporations with the earnings actually realized, some striking results are apparent. See Table III.

So confident were the promotors and bankers of the success of the trusts that they estimated the earnings resulting from consolidation to be a little over a third greater than the earnings of the separate plants before consolidation. On the basis of this estimate they considered themselves safe in making the sum of the fixed charges on the bonds and the dividends on the preferred stock to be less than a half of the estimated earnings. This conservative procedure would have worked well in practice, provided the actual earnings following consolidation had even approximated the estimates made by the promotors. But they did not. The estimated earnings were half again as large as the actual earnings of the first year after the union, and nearly twice as great (175 %) as the average earnings during the ten-year period following consolidation. The divergence between the estimates and the actual results is even more apparent when we observe that in only four out of the thirty-five cases did the earnings during the year following consolidation equal or exceed the estimates made by the promotors; and in only five cases — one-seventh of the total — did the average earnings for the ten-year period following consolidation equal or exceed the estimates made by the promotors and bankers at the time the trust was organized.

This conclusion is indirectly shown by the relative load of fixed charges and contingent preferred stock dividends placed upon the trusts at the time of consolidation. It is a well known and thoroly established principle of financial practice that the fixed interest charges and contingent preferred stock dividends of industrial or manufacturing corporations should not be more than half the net earnings, after reasonable, but not extraordinary, allowances have been made for depreciation and obsolescence. In the case of these industrial combinations it amounted to nearly three-fourths of the net earnings of the first year and the tenth year, and nine-tenths (90 % average between quartiles) of the average earnings of the ten-year period after consolidation. See Table IV.

III. COMPARISON OF THE EARNINGS OF INDUSTRIAL CONSOLIDATIONS IMMEDIATELY AFTER CONSOLIDATION WITH LATER EARNINGS

The ratios given in Table V are intended to compare the earnings of each industrial consolidation during the first full year of its existence with the earnings before consolidation and with the earnings after the trust has been fully established.

The later earnings, however, should be subject to some adjustment. In almost every case new capital was invested by the managers of the consolidation in betterments and improved equipment, not properly chargeable to depreciation and reasonable obsolescence. In some cases, like the acquisition of the Tennessee Coal and Iron Company by the United States Steel or of the Guggenheim plants by the International Steam Pump, whole units were added to the aggregate of property already owned by the trust at the time of its organization. The betterments and the new plants added materially to the net earnings of the combination, or should have done so provided the promise of increased earnings through enlarged scale of production was fulfilled. Strict accounting would require that the average, net earnings for the ten-year period and the net earnings for the tenth year should be reduced by amounts corresponding to the presumptive earnings of the added capital before these earnings were compared with the earlier earnings. However, such adjustments to the reported net earnings because of actual additions to property would be very difficult to make and controversial at best. Accordingly no such adjustments were made, so that the figures for the ten-year average and of the tenth-year earnings are greater than those of the groups of plants entering the consolidation or contributing to the earnings of the first year.

The representative earnings of consolidation during the first year were less, by about a tenth, than the average earnings during the ten-year period. The ten-year period began, in twenty cases out of the thirty-five, in 1900; it included, therefore, quite as many years of marked business activity as of marked business depression. The earnings of the first year after consolidation were greater — by a little less than a tenth (7%) — than the earnings of the tenth year. In other words, after sufficient time had elapsed to permit the consolidation to perfect its organization, to reconstruct its plants and to effect all the anticipated economies of combination and large-scale production, and after considerable sums of new money had been invested in betterments and new plants, the earnings gradually diminished until they were no more, perhaps a little less, than during the first year of consolidation. And the first-year earnings, as has been shown already, were less than the earnings of the separate plants before consolidation.

A. S. Dewing.

Harvard University.

TABLE I. — FUNDAMENTAL DATA

Name	Date incorporated	Bonds issued at incorporation	Preferred stock	Preferred stock dividend	Fixed charges
1 U. S. Leather	1893	$6,000,000	$62,282,300	8 c[3]	$360,000
2 Am. Matting	1897	none	2,500,000	7 c	none
3 Am. Linseed	1898	none	16,750,000	7 n	none
4 U. S. Envelope	1898	2,000,000	3,750,000	7 c	120,000
5 Inter. Paper	1898	8,699,000	20,530,700	7 c	521,940
6 Am. Agri. Chem.	1899	none	17,000,000	6 c	none
7 Am. Beet Sugar	1899	none	4,000,000	6 n	none
8 Am. Car and Foundry	1899	none	30,000,000	7 n	none
9 Am. Cement	1899	930,000	none	none	46,500
10 Am. Chicle	1899	none	3,000,000	6 c	none
11 Am. Hide and Leather	1899	8,445,00	13,000,000	7 c	506,700
12 Am. Pneu. Tube Service	1899	none	5,000,000	6 n	none
13 Am. Window Glass	1899	none	4,000,000	7 c	none
14 Am. Woolen	1899	none	16,000,000	7 c	none
15 Am. Writing Paper	1899	17,000,000	12,500,000	7 c	850,000
16 Inter. Steam Pump	1899	none	8,850,000	6 c	none
17 Natl. Enam. and Stamp	1899	none	7,375,000	7 c	none
18 Natl. Salt	1899	none	5,000,000	7 c	none
19 N. E. Cotton Yarn	1899	5,591,000	5,000,000	7 c	279,553
20 Pittsburgh Coal	1899	none	32,000,000	7 c	none
21 Pressed Steel Car	1899	none	12,500,000	7 c	none
22 Republic Iron and Steel	1899	none	25,000,000	7 c	none
23 Rubber Goods Mfg.	1899	none	6,196,000	7 c	none
24 Sloss-Sheffield	1899	3,835,000	6,700,000	7 n	202,575
25 Univ. Bag and Paper	1899	none	11,000,000	7 c	none
26 Crucible Steel	1900	none	25,000,000	7 c	none
27 Standard Milling	1900	5,750,000	6,900,000	6 n	287,500
28 Allis Chalmers	1901	none	25,000,000	7 c	none
29 Am. Locomotive	1901	none	25,000,000	7 c	none
30 Quaker Oats	1901	1,600,000	7,500,000	6 c	80,000
31 U. S. Steel	1901	304,000,000	425,000,000	7 c	15,200,000
32 Harbison Walker Refractories	1902	3,500,000	8,000,000	6 c	175,000
33 Natl. Candy	1902	none	2,200,000	7 c	none
34 Inter. Merc. Marine	1902	68,000,000	54,600,000	6 n	3,140,000
35 United Box Board and Paper	1902	3,873,000	14,948,900	7 c	197,380

[3] Under table of preferred stock dividend "c" denotes cumulative dividends and "n" denotes non-cumulative dividends.

TABLE I. — FUNDAMENTAL DATA (*continued*)

Contingent charges (preferred dividends)	Previous earnings	Estimated earnings	Fixed and contingent charges	First year	Tenth year	Average for ten years
$4,982,184	$4,800,000[1a]	$4,900,000[1b]	$5,342,584	$1,340,494[1c]	$4,784,997	$3,753,839[1d]
175,000	1,300,000[2a]	2,300,000[2b]	175,000	225,000[2c]	−157,503	393,117[2d]
1,172,500	1,094,374[3a]	1,800,000[3b]	1,172,000	−1,083,858[3c]	166,538	113,200[3d]
262,500	428,848[4a]	828,848[4b]	382,500	457,523	573,557	497,375
1,437,149	4,100,000[5a]	5,600,000[5b]	1,959,089	2,845,035	1,635,918	2,393,172
1,020,000	1,419,879[6a]	2,040,000[6b]	1,200,000	1,615,594[6c]	2,394,498	1,680,238
240,000	428,045[7a]	1,248,000[7b]	240,000	240,359[7c]	1,470,611	612,313
2,100,000	2,900,000[8a]	4,000,000[8b]	2,100,000	4,915,671[8c]	2,895,831	5,050,963
none	323,000[9a]	350,000[9b]	46,500	250,619[9c]	152,352	278,480
180,000	560,000[10a]	540,000[10b]	180,000	688,510[10c]	1,530,000	1,199,896
910,000	1,585,748[11a]	2,750,000[11b]	1,416,700	926,582[11c]	2,085,996	1,024,938[11d]
300,000	281,449[12a]	381,449[12b]	300,000	288,616	144,959	162,316
280,000	1,466,182[13a]	2,500,000[13b]	280,000	373,357	−556,718[13d]	−13,638[13d]
1,120,000	2,593,000[14a]	3,000,000[14b]	1,120,000	3,287,006	4,179,522	2,808,783
875,000	1,250,620[15a]	2,200,000[15b]	1,725,000	837,997[15c]	1,410,841	1,172,863
531,000	1,317,791[16a]	2,500,000[16b]	531,000	1,813,907	1,447,653	1,671,440
516,250	1,073,000[17a]	1,589,250[17b]	516,250	1,442,589[17c]	924,596	1,198,555
350,000	450,000[18a]	600,000[18b]	350,000	478,145	547,198	680,336
350,000	1,106,197[19a]	1,600,000[19b]	629,550	1,086,500[19c]	355,602	721,595[19d]
2,240,000	4,078,274[20a]	5,414,089[20b]	2,240,000	3,181,568[20c]	1,822,557	3,388,080
875,000	1,500,000[21a]	3,000,000[21b]	875,000	2,237,000	155,478	1,875,849
2,750,000	2,679,000[22a]	3,445,000[22b]	1,750,000	3,643,729	1,629,346	2,013,055
433,762	1,177,228[23a]	1,200,000[23b]	433,762	629,821[23c]	2,369,972	1,076,308
469,000	1,355,000[24a]	2,380,000[24b]	671,575	1,100,424[24c]	1,336,947	1,237,965
770,000	1,226,000[25a]	1,562,000[25b]	770,000	1,494,169	956,920	964,540
1,750,000	4,000,000[26a]	4,000,000[26b]	1,750,000	3,250,429[26c]	3,523,402	1,876,704
345,000	922,873[27a]	1,172,873[27b]	632,500	605,948[27c]	766,737	660,006
1,750,000	1,137,500[28a]	3,290,000[28b]	1,750,000	1,442,260	−18,600[28d]	707,945
1,750,000	3,000,000[29a]	3,600,000[29b]	1,750,000	3,107,177	4,122,870	4,446,091
450,000	639,248[30a]	2,000,000[30b]	530,000	540,745	1,780,095	1,052,579
29,750,000	108,000,000[31a]	100,000,000[31b]	44,950,000	98,551,542[31c]	107,830,000[31d]	92,931,854[31d]
480,000	806,572[32a]	1,116,000[32b]	655,000	1,036,489[32c]	1,325,549	1,401,543
154,000	335,000[33a]	465,277[33b]	154,000	175,655[33c]	168,255	247,556
3,276,000	6,107,675[34a]	16,100,000[34b]	6,416,000	4,000,522[34d]	3,941,747[34d]	3,439,514[34d]
1,046,423	1,667,000[35a]	1,872,000[35b]	1,243,803	279,710[35c]	182,874	282,282

NOTES FOR TABLE I

1*a*. Prospectus of company. See Dewing, A. S., Corporate Promotions and Reorganizations, p. 21.

1*b*. This is one of the three cases in which the estimate of earnings was not obtained from printed sources. One of the tanners stated in conversation that the "net saving would be at least $300,000, which would result in increased profits." On this basis the estimated earnings were obtained by adding the "previous earnings" to $100,000. Unquestionably the tanners believed that the profits would be vastly larger. They planned numerous "economies," and laid great stress in their conversations with bankers upon the increased earnings following the suspension of competition. The figure used here is, therefore, very much less than that confidently expected by the promotors. See also ibid., p. 21.

1*c*. This represents the first full year. 60 Commercial and Financial Chronicle 391. (The references to this periodical will be abbreviated hereafter, Chron.)

1*d*. In computing the average, the published earnings for the first 20 months were reduced to a 12-month basis. This gave the constructive earnings of the first year as $472,053. This reconstruction was necessitated by the change in the corporation's fiscal year. See table of earnings, Dewing, Corporate Promotions and Organizations, p. 22, footnote 3.

2*a*. Average of the preceding five years, 65 Chron. 619.

2*b*. Ibid.

2*c*. Dewing, Corporate Promotions and Reorganizations, p. 294, footnote 1.

2*d*. Earnings for third year, adjusted owing to change in fiscal year.

3*a*. Average of preceding four years, 67 Chron. 1206.

3*b*. Estimate of "$1,800,000 to $2,000,000." Ibid.

3*c*. Computed by adding five-twelfths of the profits of 1900 to the deficit for the 7 months of 1899 during which company operated.

3*d*. From 1902 to 1909 the company published no reports. The probable profits have been constructed from the surplus as at the beginning and end of the period, with adjustments for capital expenditures during the intervening period.

4*a*. 66 Chron. 1003.

4*b*. Ibid.

5*a*. 67 Chron. 177.

5*b*. 13 U. S. Ind. Com. of 1901, 409.

6*a*. Average preceding five years, 68 Chron. 974.

6*b*. This is the second of the three cases in which the estimate of earnings is not obtained from printed sources. It is based on two statements, both agreeing that the company would be able to earn at least 6 per cent on its common stock. One of these statements was made by a prominent manufacturer to a small independent who was asked to enter the consolidation. One other was made to a banker by a man close to the promotion.

6*c*. Adjusted to 12 months from published statement of 14 months.

7*a*. Average preceding two years, 68 Chron. 280.

7*b*. Ibid.

7*c*. Adjusted to 12 months from published statement of 21 months.

8*a*. 68 Chron. 1029.

8*b*. 68 Chron. 280.

8*c*. Adjusted to 12 months from published statement of 14 months.

9*a*. 69 Chron. 1249.

9*b*. Ibid.

9*c*. Adjusted to 12 months from published statement of 16 months.

10*a*. 68 Chron. 1021.

10*b*. Ibid.

10*c*. From published statements the earnings for the first period of 13 months were constructed. This figure was then adjusted to a 12-month basis.

11*a*. 70 Chron. 77.

11*b*. 69 Chron. 646. More extravagant estimates were made by the promotor. One Thomas J. Ryan, in Shoe and Leather Reporter, May 18, 1899, estimated "economies of consolidation" at $4,000,000; in ibid., May 24, 1899, $5,300,000 to $6,900,000 or "7% on the preferred and from 8% to 12% on the common stock."

11*c*. Adjusted to 12 months from published statement of 9 months.

11*d*. The sinking fund on the bonds was deducted, as was not done in other cases, from the net earnings because the management and its auditors specifically state that the sinking fund on the bonds was a charge in lieu of depreciation.

12*a*. Given at $300,000 in 68 Chron. 1130. Figure stated above taken from banker's circular, at time of promotion.

12*b*. Banker's circular at time of promotion.

13*a*. Average for preceding three years, 69 Chron. 745.

13*b*. 69 Chron. 745.

13*d*. The company published no reports from 1902 to 1909, due probably to the excessive losses it was enduring. On September 1, 1902, the report showed an apparent surplus of $819,862. On September 1, 1909, the report showed an apparent deficit of $3,067,165. The above average is based on the assumption that the net loss of $3,897,027 during the intervening seven years can be prorated — $556,718 average loss per year.

14*a*. 68 Chron. 472.

14*b*. This is the third of the three cases in which the estimate of earnings is not obtained from printed sources. The bankers who were interested in the underwriting of the securities were assured by the mill operators that the company would earn "6% on its common stock" and would probably do better. This estimate is, therefore, computed as the preferred dividend of 7 per cent together with a common dividend of 6 per cent.

15*a*. Average for the preceding ten years, 69 Chron. 128.

15*b*. 69 Chron. 128.

15*c*. Adjusted to 12 months from published statement of 17 months.

16*a*. 1900 Moody 617.

16*b*. 68 Chron. 723.

17*a*. 68 Chron. 187.

17*b*. Ibid.

17*c*. Adjusted to 12 months from published statement of 11 months.

18*a*. 68 Chron. 524.

18*b*. Ibid.

19*a*. 69 Chron. 81; Dewing, Corporate Promotions and Organisations, p. 316.

19*b*. Ibid.

19*c*. Adjusted to 12 months from published statement of 11½ months.

19*d*. Computed from successive published balance sheets. Sinking fund on bonds deducted from net earnings as company considered such charges were made in lieu of depreciation.

20*a*. 69 Chron. 442.

20*b*. Ibid.

20*c*. Adjusted to 12 months from published statement of 16 months.

21*a*. 68 Chron. 131.

21*b*. Ibid.

22*a*. 68 Chron. 674.

22*b*. Ibid.

23*a*. 68 Chron. 872.

23*b*. Ibid.

23*c*. Adjusted to 12 months from published earnings of 11 months.

24*a*. 69 Chron. 286.

24*b*. 8 Ind. Com. Rep. of 1901, 55.

24*c*. 72 Chron. 774.

25*a*. 68 Chron. 333.

25*b*. Ibid.

26*a*. 73 Chron. 841.

26*b*. 71 Chron. 32. "Confidently expected earnings will be largely increased." This was the current report in the Pittsburgh district. One rumor stated that the earnings would be "twice as great." Nevertheless, in the absence of direct evidence for a larger estimate, the estimated earnings were considered the same as the previous earnings.

26*c*. Adjusted to 12 months from published earnings of 13 months.

27*a*. 68 Chron. 929.

27*b*. Ibid.

27*c*. 75 Chron. 1252. Reference inexact "12 to 14 mos." Computed on average of 13 months and reduced to 12 months basis.

28*a*. 72 Chron. 874.

28*b*. 72 Chron. 937.

28*d*. Boston News Bureau, October 12, 1911—after allowing for depreciation.

29*a*. 72 Chron. 1036.

29*b*. Boston News Bureau, November 14, 1901.

30*a*. 68 Chron. 329.

30*b*. Ibid.

31*a*. Wilgus, United States Steel Corp., p. 83.

31*b*. 72 Chron. 441.

31*c*. Adjusted to 12 months from published earnings of 9 months.

31*d*. The computation of the United States Steel Corporation's "net earnings" has always presented considerable difficulties owing to the management's avowed purpose of charging capital betterments to earnings. Wall Street has interpreted this policy as "squeezing out the water." Expedient tho it may be from the standpoint of business, it is disconcerting to the statistician, especially in an inquiry like the present, where uniformity in methods of accounting is a prerequisite to the value of any of the conclusions. In this study the net earnings of the United States Steel Corporation were computed as the sum of: surplus for the year, sinking fund on subsidiary and parent bonds and interest of United States Steel Company bonds, expenditures made for additional property, preferred and common stock dividends.

32*a*. 74 Chron. 1359.

32*b*. Ibid.

32*c*. Adjusted to 12 months from published earnings of 15 months.

33*a*. Average of three years, 75 Chron. 983.

33*b*. Estimate computed from estimated capacity (75 Chron. 983) reduced to current basis of profit.

33*c*. Adjusted to 12 months from published earnings of 15 months.

34*a*. 76 Chron. 975. In 79 Chron. 157, it is stated that the average for the preceding 5 years, before depreciation, was $6,519,017. Also, by dead reckoning, the estimated earnings would appear to be $9,500,000, provided tonnage of 1903 had been in service.

34*b*. Ripley, W. Z., Trusts, Pools, and Corporations, p. 107.

34*d*. These are based on the published earnings. Later the management admitted that the depreciation reserves had been inadequate and charged off a lump sum from the excessive earnings of the Great War. An attempt was made in another connection to determine the earnings more accurately by prorating the depreciation. The largest published earnings, however, were used here so as to give the corporation the benefit of a possible doubt. See Dewing, Financial Policy of Corporations, vol. 4, p. 49.

35*a*. Average of preceding three years, 75 Chron. 247.

35*b*. 75 Chron. 1044.

35*c*. Adjusted to 12 months from published earnings of 5 months 6 days.

TABLE II. — EARNINGS OF THE SEPARATE PLANTS BEFORE CONSOLIDATION COMPARED WITH EARNINGS AFTER CONSOLIDATION

	Previous to estimated earnings	Previous to sum of fixed and contingent	Previous to first year	Previous to tenth year	Previous to ten-year average
1	98.0	90.0	large	100.3	128.0
2	56.5	743.1	577.5	large	330.8
3	60.8	93.3	large	658.0	966.0
4	51.7	111.8	93.9	74.9	86.2
5	73.3	209.3	144.1	250.9	171.5
6	69.6	118.2	87.8	59.3	84.5
7	34.3	178.4	178.6	29.1	70.0
8	72.6	138.1	58.9	100.1	58.5
9	92.3	69.0	128.8	212.2	115.9
10	105.7	311.0	81.4	36.6	46.7
11	57.7	112.0	171.2	75.9	154.8
12	73.8	93.7	98.0	194.2	173.1
13	58.7	523.6	393.1	large	large
14	86.4	231.2	78.9	62.0	92.4
15	56.9	72.5	149.5	88.7	106.6
16	52.7	248.0	72.6	91.1	78.7
17	67.5	208.1	74.4	116.2	89.6
18	75.0	128.6	93.1	82.2	66.1
19	69.1	176.0	101.8	311.8	153.5
20	75.3	182.0	128.1	223.9	120.4
21	50.0	171.3	67.1	9.6	79.8
22	74.8	147.5	70.7	158.3	128.1
23	98.3	272.0	187.1	49.7	109.3
24	56.9	201.9	123.1	101.3	109.5
25	78.5	159.3	82.2	129.5	128.5
26	100.0	228.5	123.0	113.4	213.0
27	78.6	146.1	152.2	120.4	139.6
28	34.6	64.9	78.8	large	160.6
29	83.3	171.6	96.5	72.8	67.5
30	32.0	120.8	118.2	35.9	60.8
31	108.0	240.3	109.6	100.1	116.2
32	72.7	123.0	77.8	60.8	57.5
33	72.0	218.5	191.0	199.1	135.4
34	37.9	95.3	152.6	154.9	177.1
35	89.0	134.1	596.0	912.5	588.5
Median	72.6	171.3	118.2	101.3	116.2
Average between quartiles	70.1	166.8	118.5	122.4	118.5

TABLE III.—PROMOTORS' ESTIMATES OF EARNINGS COMPARED WITH PREVIOUS AND LATER EARNINGS

	Estimated to previous	Estimated to sum of fixed and contingent	Estimated to first year	Estimated to tenth year	Estimated to ten-year average
1	102.1	91.6	large	102.4	132.4
2	177.0	1314.0	1022.2	large	585.0
3	164.5	153.3	large	108.2	1589.0
4	193.2	216.5	181.1	144.5	166.7
5	136.6	285.9	196.8	342.5	234.1
6	143.7	170.0	126.3	85.2	121.5
7	291.0	520.0	519.6	84.8	203.9
8	137.9	190.5	82.4	138.1	79.2
9	108.6	752.9	139.6	229.8	125.6
10	96.5	300.0	78.4	35.3	45.0
11	173.5	194.1	297.0	131.8	268.5
12	135.6	127.2	132.1	263.2	235.0
13	171.0	893.5	669.1	large	large
14	115.7	267.9	91.3	71.7	107.1
15	175.9	127.5	262.9	155.9	188.7
16	190.0	471.6	137.8	172.9	149.5
17	148.0	307.5	110.1	172.0	132.5
18	133.5	171.5	125.6	109.6	88.3
19	144.7	254.2	147.2	451.1	222.0
20	132.9	241.9	170.2	297.6	159.9
21	200.0	343.0	134.4	1930.5	160.1
22	128.7	197.1	94.6	211.7	171.2
23	102.1	277.0	190.8	50.7	111.5
24	175.5	354.5	216.3	178.1	192.5
25	127.5	202.9	104.5	165.2	162.1
26	100.0	228.3	123.0	113.5	213.2
27	127.2	185.4	193.5	152.9	177.7
28	289.0	188.1	227.9	large	464.9
29	120.0	205.9	115.8	87.3	81.0
30	312.9	377.6	370.0	112.2	189.9
31	92.6	222.5	102.9	92.7	107.8
32	138.5	170.5	108.6	84.2	79.8
33	138.9	302.2	265.2	277.0	188.4
34	263.9	251.1	402.7	408.0	467.0
35	112.4	150.3	669.2	102.3	662.0
Median	138.5	228.3	147.2	165.2	171.2
Average between quartiles	145.0	239.4	186.1	189.2	174.8

Table IV. — Comparison of the Sums of the Fixed and Contingent Charges, with the Previous, the Estimated and the Later Earnings

	Sum of fixed and contingent to previous	Sum of fixed and contingent to estimated	Sum of fixed and contingent to first year	Sum of fixed and contingent to tenth year	Sum of fixed and contingent to ten-year average
1	111.2	109.0	large	111.6	142.4
2	13.5	7.6	77.7	large	44.5
3	107.1	65.2	none	732.5	1039.0
4	89.8	46.4	84.3	67.2	77.3
5	47.8	35.0	68.8	119.7	83.9
6	84.8	58.9	74.6	50.3	71.6
7	56.0	19.2	99.9	16.3	39.2
8	72.4	52.5	42.7	72.5	41.5
9	14.4	13.3	18.6	30.5	16.7
10	32.1	33.3	26.1	11.8	15.0
11	89.2	51.5	152.9	68.7	138.3
12	106.6	78.7	104.7	207.1	184.7
13	19.1	11.2	75.1	large	large
14	43.2	37.3	34.1	26.8	39.9
15	138.0	78.3	205.9	122.1	147.1
16	40.3	21.2	29.3	36.7	31.8
17	48.0	32.4	35.7	55.8	43.1
18	77.8	58.3	73.2	64.0	51.4
19	56.8	39.4	57.9	177.3	87.3
20	54.8	41.3	70.3	122.8	66.1
21	58.3	29.2	39.1	563.0	46.7
22	65.3	50.8	48.0	107.4	86.9
23	36.8	36.1	68.9	18.3	40.3
24	45.5	25.9	56.0	50.3	54.3
25	62.8	49.2	51.5	80.5	79.8
26	43.8	43.8	53.8	49.7	93.2
27	68.5	53.9	104.4	82.5	95.8
28	153.9	58.2	121.1	large	247.1
29	58.3	48.6	56.3	42.4	39.4
30	82.9	26.5	98.1	29.6	50.3
31	41.6	45.0	45.7	41.7	48.4
32	81.3	58.7	63.2	49.4	46.7
33	45.9	33.1	87.7	91.5	62.2
34	105.0	39.9	160.4	162.8	186.5
35	74.6	66.3	444.0	690.0	439.2
Median	58.3	43.8	70.3	72.5	71.6
Average between quartiles	62.7	43.4	72.3	72.1	90.1

Table V. — Comparison of the Earnings of the First Year with the Previous Estimated and Later Earnings

	First year to previous earnings	First year to estimated earnings	First year to sum of fixed and contingent charges	First year to tenth-year earnings	First year to ten-year average
1	small	small	small	small	small
2	17.3	9.8	128.5	large	57.2
3	small	small	small	small	small
4	106.9	55.2	119.5	79.8	92.0
5	69.5	50.8	145.2	174.1	119.0
6	113.9	79.2	134.7	67.5	96.2
7	56.2	19.3	100.3	16.4	39.4
8	169.6	122.9	234.2	169.8	97.5
9	77.7	71.7	539.0	164.6	90.0
10	121.9	127.4	382.5	45.0	57.4
11	58.4	33.7	65.4	44.4	90.4
12	102.6	75.5	96.3	199.2	177.9
13	25.5	14.9	133.5	small	small
14	126.9	109.6	298.8	78.7	117.1
15	67.1	38.1	48.6	59.4	71.4
16	137.7	72.6	361.1	125.4	108.5
17	134.3	90.8	279.8	156.2	120.4
18	106.2	79.7	136.6	87.5	70.3
19	98.4	68.0	172.9	306.5	150.7
20	78.0	58.8	142.0	174.6	93.9
21	149.0	74.5	255.7	1437.0	119.1
22	136.2	105.8	208.4	223.9	181.2
23	53.4	52.5	145.0	26.6	58.4
24	81.3	46.3	164.1	82.3	89.0
25	121.8	95.7	194.1	156.2	155.0
26	81.3	81.3	185.9	92.2	173.5
27	65.8	51.7	95.8	79.1	91.9
28	126.8	43.8	82.4	large	203.8
29	103.6	86.3	177.7	75.3	69.9
30	84.7	27.1	102.2	30.4	51.5
31	91.1	98.6	219.1	91.3	106.1
32	128.6	92.8	158.3	78.2	73.9
33	52.4	37.8	114.0	104.5	71.0
34	65.6	24.8	62.4	101.5	116.5
35	16.7	14.9	22.4	152.2	98.7
Median	84.7	58.8	142.0	91.3	91.9
Average between quartiles	89.4	60.7	145.1	107.8	89.6

THE DOMESTIC AND FOREIGN WOOL MANUFACTURES AND THE TARIFF PROBLEM

SUMMARY

I. Conditions on the Continent, 103. — In Great Britain: technical advance, 106. — Overhead charges, 113. — Labor conditions, 114. — II. American experience: overexpansion of productive capacity and increase in disadvantageous lines, 118. — Conditions of technical equipment, 120. — Wage conditions, 126. — Standardization of products, 128. — Industrial organization, 129. — Possible improvement in competitive strength of American industry: through technical advance, 130. — Through control of wages, 133. — Through increased standardization, 134. — Conclusion, 135.

The prospective revision of the tariff into a "permanent" form may serve as the occasion for a reconsideration of the competitive position of the American wool-manufacturing industry, the industry whose tariff schedule has in the past been of outstanding importance in any general change of import duties. Beyond the importance arising from the intrinsic place of this industry in our economic life, a certain significance attaches to these tariff paragraphs by reason of the impression which has in recent decades been quite widely accepted, that Schedule K formed "the backbone of protection." It suffices to point in this connection to the part played in subsequent political discussions by the wool paragraphs incorporated into the Payne-Aldrich Act.

Without prognostication of the probable future tariff rates, we may profitably examine the experience of the American and foreign wool-manufacturing industries during the last decade or so, noting particularly those changes in their economic position which add to or detract from the competitive strength of the domestic trade, and deriving therefrom the situation in which the anticipated tariff revision finds the American industry. In considering these questions, it will be convenient to survey the foreign manufactures first.

I

Interest centers strongly upon the Continental industries at the present time, perhaps in part from the fact that actual knowledge of industrial conditions in those countries is relatively scant and that conditions there are more unstable than in Great Britain or the United States. Take, for example, the matter of raw material supplies for the Continent. We know that supplies of wool in France, Belgium, and Germany were peculiarly low at the time of the armistice, and that replenishment has gone on haltingly since that time, complicated by the lack of purchasing power on the part of Continental merchants and manufacturers, lack of credit facilities, the uncertainties of exchange, and in the case of Germany and Austria the question of pre-war debts. Belgium, then France, and more recently Germany, have been able to buy in the English or colonial wool markets — or to some extent at the wool sales at Antwerp specially arranged for by the British government and the London wool brokers — but purchases must, on account of exchange fluctuations, be intermittent. Germany this month may be able to buy largely — even dominate a quiescent London market — but next month may be forced by falling exchange rates to withdraw almost completely. Just how adequately stocked the Continental mills may be we can only guess.

Nevertheless, progress on all lines has undoubtedly been made. Peace found working forces largely scattered or disorganized, machinery destroyed or perforce allowed to deteriorate, and commercial connections broken. The French wool manufacture suffered most. The enemy controlled the great wool center of Roubaix-Tourcoing, and small centers such as Fourmies and Le Cateau; and the second largest wool-manufacturing city was the much devastated Rheims. Recovery has been retarded, moreover, by serious labor difficulties, especially around Roubaix. In Belgium, the losses of the industry were due in part to the dislocation of its working force, and in part to the removal and wearing-out of technical equipment; but on the whole the Belgian manufacture survived as well as any in the belligerent countries of the Continent. From what one can learn of it, the German industry falls between these two extremes. The Belgian manufacture in any case would probably have revived first; but the German would presumably have outstripped the French in recovery, had it not been for general factors operating in Germany, such as the uncertainties of the peace terms, internal unrest, and particularly disadvantageous exchange relations. Speaking generally, conditions on the Continent as a whole have so far changed that whereas in the summer and fall of 1919 Continental manufacturers were glad to secure work on commission from English houses, more recently French and Belgian yarns and cloths have invaded the English and other foreign markets and, as above intimated, the Germans have been able to purchase raw material quite extensively in the world markets and begin work "on their own."

Apparently as an indirect result of the war, the Continental manufacturers have secured, at least temporarily, a position of greater competitive strength than they possessed in the pre-war period, despite such adverse factors as (probably) lowered efficiency. It will perhaps be recalled that the Tariff Board ten years ago found the conversion costs in e. g., the German industry (where among Continental countries inquiry seems to have been most adequate) were somewhat less favorable, as compared with those of American producers, than those of English manufacturers.[1] It is also true that the free-trade English market was relatively free from Continental importations, and that the bulk of such importations that did reach England was in character different from the chief British productions: imports of French-system or Belgian-system yarns, cloths of the soft, Continental type, and the like.

Data on the current situation are of course relatively scarce, but certain facts are available. Rates for commission scouring, carbonizing, and combing are always suggestive tho indicating probably the extreme in comparative costs throughout the whole industry. In this connection, a recent German combing schedule may be instanced. The charges therein ran from approximately 5¾ cents per pound for low crossbred wool to 6⅔ cents for merino to half-blood.[2] Such rates appear as 40 to 60 per cent of the current Bradford charges, and the latter in turn are 50 to 70 per cent of representative American rates. As the *Wool Record* states in comment upon the German charges, "There is no doubt that when trade does begin to revive, competition in all the markets of the world will be exceptionally keen." Already the British industry is feeling the competition of Continental producers along certain lines, as in the supply of knitting yarns to the Leicester knit-goods trade. During the war period, the British spinners had a practical monopoly of this business, but now the soft, French-system worsted yarns and the Belgian-system woolen

---

1. Tariff Board Report on Wool and Wool Manufactures, pp. 16, 17.
2. Wool Record and Textile World (Bradford, Eng.), March 10, 1921, p. 15. The German charges were converted at the then existing rate of exchange.

yarns from the Continent are making severe inroads into it and pushing out British yarns of both the French and the Bradford worsted systems.[3] Repeatedly in the British discussions of their own present situation appear forebodings of severe trials from the future increased Continental importations.

The causes of such an alteration in competitive strength are difficult to ascertain. As far as I know, they arise from no conditions peculiar to the wool manufacture, but wholly from the general economic forces. Such factors as a lowered standard of living among Continental peoples, an incitement to more continuous labor flowing from the worsened position of the workers, and the eagerness of manufacturers to secure employment for their men and their machines undoubtedly play their part. Whether such a situation is to be the post-war normal is of course problematical. All we can now say is that conditions in the wool manufacture will presumably follow the general economic and industrial movement.

With respect to the changes in the British industry itself and in its competitive position, it will suffice for our purposes to consider three general phases: the technological aspect, certain overhead charges, and the labor side. Changes in the technique of the British industry in the last decade, tho not revolutionary, have shown in some aspects distinct advance. For example, largely as an indirect result of the war, the scope of raw materials employed generally through the British industry has been broadened. In pre-war times wools containing so much vegetable matter as to require chemical treatment, or so-called "carbonizing wools," were usually disposed of on the Continent. British woolen manufacturers would not bother with this inferior tho cheap stock. During the war, however, the British were compelled to use more and more of this type of wool, carbonizing capacity was materially increased, and today the British woolen trade can work and does work this relatively inexpensive staple. It has been stated, moreover, that the better lengths of such wool have been utilized in blends for the manufacture of tops.[4] Again, before 1914, South African and South American wools were largely neglected by the British wool manufacture, chiefly by force of habit or prejudice. War exigencies compelled British combers and spinners to become acquainted with these staples. They will accordingly be able not only to secure somewhat varying effects by the utilization of these wools, but also to take advantage of variations in price of these goods from that of their better known Australasian wools.

---

[3] A recent comment from England reads: "Both France and Germany can sell much below British prices in Botany (the finer) yarns, and this is especially noticeable in fine singles and two-folds. In 2–66s and 2–70s the disparity is said to be as much as 1 *s.* per pound (around 15 per cent), and this is entirely due to the lower conversion costs on the Continent." Wool Record and Textile World, September 1, 1921, p. 559.

On the American side, changes of the above types have not been numerous, nor in some cases do they promise to be permanent. Take, for example, the situation with respect to Cape wools. Before the war, under the Republican tariffs, trade in these fleeces was negligible. Because of the fine character of these wools and of the sandy country in which they are grown, they have a peculiarly high shrinkage, and consequently could not be advantageously imported. During the war, with free importation of wool, South African staples became a fairly common article in our markets.[5] Whether or not this trade can be continued, depends on the character of the wool duties enacted in the new tariff. A somewhat similar story with a somewhat similar ending might be woven around certain South American wools, such as the fine Uruguayan wools, or the low crossbreds which in the last year or two have found employment in our carpet trade.[6]

---

[4] Such a development is disputed in the trade, but because of prejudice against the use of carbonised wools at all in the worsted industry it is difficult to ascertain the exact truth.

[5] This movement was aided by the fact that the Australasian wools were taken over by the British government.

In the matter of technical equipment, two significant changes during the last decade have been the spread of the automatic doffer and the Northrop automatic loom. The former, a labor-saving device of a typically American sort, has been developed, oddly enough, exclusively in England. So far as I know, it has found absolutely no favor in our industry. By means of the automatic doffing "motions" (which in some cases may be attached to old frames and in others are the normal attachment of new spinning machines), the full bobbins upon one whole side of a spinning frame of either the cap or flyer types may be removed or "doffed," as the phrase goes, at one and the same time, and empty bobbins placed on the spindles.[7] The device eliminates the necessity of handling each bobbin separately, work which in the English mills has been one of the last important employments of "half-times." Yet the increased adoption by progressive British mills of this contrivance, altho fitting in well with the impending abolition of "half-timers," is not wholly the product of that new situation, since developments along this line date back to the eighties and adoption there has been going on gradually ever since that time. The installation of such "motions" has been considerably quickened in the last decade or so. American mill men, it is said, find it more advantageous to add something to the pay of the spinner who then takes care of the doffing. Can it be that the American wool-manufacturing industry, by virtue of its supply of immigrant labor, has reached the stage when it has no incentive to put in labor-saving improvements?

---

[6] Probably a more interesting change in the American raw material supply during the last decade has been the decline in the fine wool production within the United States, and the consequently greater dependence upon foreign, especially Australian products. But this involves a change in quantity, not of kind, and so has little influence on the matter now under consideration.

[7] There are at least six different "motions" on the British market for spinning frames, and one has recently been devised for roving frames.

The automatic loom which has found favor in the British weaving sheds is of the Northrop type. "Northrop" and "automatic" are synonymous in the present British wool-manufacturing nomenclature. As yet the automatic loom of the box type which has been developed by the Crompton & Knowles Loom Works of Worcester (Mass.) has not been introduced in England, despite the fact that the ordinary box loom of the Crompton & Knowles type, made by the Dobcross people in England, one time licensees of the American firm, is the box loom most widely used in the woolen and fancy worsted districts of Great Britain.[8] On the whole, the automatic loom seems to have made less headway in England than in the United States. The character of a considerable portion of the British production — fine goods or goods of special design and limited quantity — does not fit well with the economy of this machine. At present geographically as well as industrially the scope of the loom is limited. For example, none are to be found in the Bradford district, even the Northrop loom not having been as yet adapted to the particular requirements of that manufacture. Outside the Huddersfield plain goods and the flannel areas, few automatic machines are employed. On the other hand, the automatic loom has found considerable favor in the American industry. One plant working lustre wools, mohair, and alpaca has a virtually complete weaving equipment of these machines. Other mills have adopted it for portions of their work, even in lines where as yet it has not been tried abroad.[9] Accordingly, there is, I believe, a good prospect that in the wool manufacture, as in the cotton trade, the United States will lead the way in the wider utilization of this type of machine.

---

[8] One reason which is advanced for the readier adoption of the Northrop machine in the British worsted manufacture is that the greater homogeneity of worsted yarns in that country permits the use of a plain or single-shuttle loom. For many if not most mills in this country, it is necessary in weaving even single-color goods to employ at least two shuttles — requiring of course a box loom — both containing yarn that is theoretically identical in character. As the weaving proceeds, the shuttles are used alternately, or, in the jargon of the industry, the "fillings are mixed." Were such precautions not employed, the finished cloth would show a streak where a change occurred in the yarn delivered by the single shuttle (as one bobbin ran out of yarn and another was inserted), merely by reason of the yarn's lack of homogeneity.

Another development of recent years, suggestive rather than of immediate competitive value, is the continuous woolen spinning frame. This mechanism, originally introduced in the spinning of cotton waste, holds out the possibility of eliminating the waste of time and the expense of skilled supervision involved in the operation of the woolen mule with its intermittent spinning action and its complicated system of movements. Essentially it is a modified ring frame. Altho spindles on such frames form an almost negligible proportion of total woolen spindles in the United Kingdom (little over 1 per cent), they have been found by some manufacturers to be of considerable utility for certain purposes, especially spinning substantial weights of good stock.[10] Such machines have not found welcome in this country, nor as far as I know, has there been a serious attempt to improve on the English mechanism.

Some progress, again, has been made in the British industry during the last decade in the elimination of hand labor in the processes intermediate between spinning and weaving. Two such processes rarely seen in American mills but still occasionally found in British plants are warping and hand-dressing. In the former process, the yarn is wound from the bobbins on to big, slow-running "warping mills" for the purpose of making up sections of the warp. Subsequently these sections are wound upon the loom beam. Dressing by hand is utilized at the time of this transference of warp to the loom beam in order that the various yarns of the warp should be properly and evenly arranged. By the improvement of beaming machinery and the greater development of motor transport (facilitating mill-to-mill transfers of the heavy and bulky loom-beams) the necessity of dividing the operation and of skilled manual intervention has been eliminated for most work. Warping and dressing are considered moribund trades in England. They persist only in certain localities and certain mills, especially in the dress-goods trade of the Bradford district.[11]

---

[9] For instance, I have seen notice in an American textile magazine of a blanket mill to be completely equipped with automatic looms, a project which as yet would not be considered in England.

[10] One Yorkshire manufacturer, usually inclined to break with the old British habit of secretiveness, thought so highly of it that tho communicative on other matters he refused to discuss this machine or to let visitors into his spinning shed.

A further point of importance in connection with the technological aspect of the British wool manufacture is the marked increase within that industry of interest in scientific research, a curious instance of the influence of the chief loser in the World War upon one of the victors. A British Research Association for the Woolen and Worsted Industries has been formed among the manufacturers. Subscriptions of considerable amount have been raised, which together with a subsidy from the government's Department of Scientific and Industrial Research have enabled the purchase and equipment of a laboratory and the inauguration under experts of inquiries into various fields of wool-textile technique, such as woolen spinning and cloth finishing, of which little of a scientific character is known.[12] The discoveries made and the data developed in the course of these inquiries are published for the use of the Association members only, of which there are now over 450. The hope of the Association is, of course, to give "members the start by secret information" altho the data may in a year or two leak out to other manufacturers in England and particularly to those in competitive nations.[13]

---

[11] This change in British practice is significant despite the fact that it is really an adoption of earlier American practice.

But the course of the British industry has not been wholly forward, even in the technological aspect alone. One of the disadvantages, from a British point of view, arising indirectly from the war conditions is a decline in British standards of acceptable workmanship, as for example in finished cloths — a situation recognized by the British themselves. The increase in the number of burlers and menders in the mills themselves is instanced as an indication of the less efficient production of the goods, while in the merchandising trade it is stated that cloths have during and since the war passed as A-1 which prior to 1914 would have been shipped back to the manufacturer as unsatisfactory. This phenomenon may be merely the result of the war strain among the workers, as far as the manufacturing faults are concerned, or of the keenness of demand for all sorts of woolen goods which until the recent depression prevailed throughout England and condoned both carelessness of the workers and defects in the fabrics. The present period of depression may be corrective in both fields.

Passing to overhead charges, we may note that certain important items of general mill expense have increased not only more than the average enhancements of cost, but more than similar expenses in this country — among them, coal, dyestuffs, and taxes. Cheap coal has, of course, been for decades a supposedly firm foundation for British manufacture. It would be indulging too much in prophecy to state that coal in England will never be cheap again. But for the present the fuel item has become a much more considerable portion of the factory expense than ever before, and there is no immediate prospect of a change from this situation. Yorkshire and Scotland, to be sure, possess splendid possibilities in the development of hydro-electric power; but as yet little has been done for the wool manufacture in this regard. Wool dyes, too, have presented a somewhat serious problem to the British dyers. The manufacture of dyestuffs in England, as in the United States, seems destined to need governmental assistance for some years. In consequence, at least temporarily, the cost of dyestuffs is enhanced somewhat more than other costs have been increased in the last few years. The American dye industry, as it happens, before the war had produced a few of the standard wool dyes, and during the war period found wool dyes easier to develop. The wool manufacture has consequently been less disadvantageously affected than some other textile trades. Finally, the substantial increase in taxes, with the possibility of a higher range of prices for some articles through the duties on imports involved in the "safeguarding" of British industries,[14] or in imperial preference, should be mentioned, together with the charges upon the industry for health insurance and the like. By the degree to which the British manufacture is more unfavorably affected by such factors as these than is the American industry, so is the competitive position of the American improved.[15]

---

[12] It is remarkable how little has been done in the way of scientific investigation in this industry, one of the oldest of man's activities. For example, men have been fulling cloth for hundreds of years, and yet the question is not fully decided why woolen cloths do full.

[13] Wool Record and Textile World, April 28, 1921, p. 41.

---

[14] The British wool-manufacturing interest is apparently opposed to this policy; see a manifesto signed by many influential Yorkshire producers in the Wool Record, July 14, 1921, p. 106.

Let us turn to the labor, the third of our subdivisions. Perhaps no phase of the British wool manufacture, with the possible exception of the industrial organization, has in the past contrasted more sharply with the American industry than that of the labor supply and organization, and in some respects this contrast has been heightened by the events of the last four or five years. Despite the demands for military forces during the war, the wool manufacture in the greater portion of its field was able, by reason of the military need for clothing as well as for men, to keep its working forces fairly well together. Some "dilution" with female labor did of course take place, and probably in part will be retained; but at least a fair proportion of these workers were partially trained operatives, for instance, women who had before marriage worked in the mills and who now with the increased cost of living or with the absence or death of their husbands were impelled to reënter the industrial field. It appears, too, that at demobilization the wool workers, perhaps by reason of the strong British characteristic of habit, returned in large numbers to their pre-war employment. In short, the skill of the British workers, which plays a considerable part in the manufacture of somewhat better goods at somewhat less cost, has probably not been seriously impaired by the war's upheaval. The temporary slackness of quality in work spoken of above will probably pass away, and something of the old conditions revive.

In this connection it may be pointed out that com-

---

15. Accurate statistics of these changes are very difficult or practically impossible to secure. Estimates for England were given by a British manufacturer recently. He found the ratios of the existing prices to pre-war prices for the several groups of goods and services mentioned above as: coal, 300–400 per cent; machinery, 300–500 per cent; insurance on stocks, 300–600 per cent; dye wares, 700 per cent; and various groups of wages at 320–350 per cent. Wool Record and Textile World, February 3, 1921.

paratively and absolutely the American labor forces have probably improved in character in recent years. At least, were another investigation to be made such as that of the Tariff Board into the turnover in the American mills, it is unlikely that such extraordinary frequency of movement into and out of the wool manufacture and from one mill to another within the industry would be discovered.[16] This change I attribute to the temporary diminution of the immigrant flood and to the relatively prompt and high advances in wages which have been made by the wool manufacture as compared with other industrial lines.[17] Of the permanence of this improvement, however, one may be doubtful.

The British wool industry has a further advantage from the point of view of labor, that of organization or perhaps we may call it orderliness. The formation of manufacturers' associations on the one side and of labor unions and labor union amalgamations on the other proceeded fairly rapidly during the war period and the year or so afterwards. The industry was accordingly well equipped for the adoption of that method of settling industrial troubles which involves the so-called Whitley Councils. Such an institution was organized in the early part of 1919, and by virtue of the dominance of one or two exceptional leaders on either side, perhaps also by reason of a rather conservative temper among the British wool workers, the Council has had on the whole very good success. Indicative of its effectiveness, in addition to the avoidance of all strikes and lockouts in the past unsettled two years, is the smooth working of its arrangements as to wages. War bonuses which had been given during the war years in terms of percentage of the pre-war wage rates were converted in 1919 into cost-of-living bonuses and tied directly to the index of the cost of living prepared by the Ministry of Labor. The test came, of course, when the peak of prices was reached and recession began. Suffice it to state that altho the cost-of-living percentage for time workers reached the point of 175 per cent above the 1914 base, it subsequently declined to 133 per cent without stoppage of work. Moreover, when the wage agreement came up in July, 1921, for readjustment, the workers accepted a cost-of-living bonus actually less than they would be entitled to if the direct correlation of cost-of-living index and bonus were adhered to.[18]

---

[16] Tariff Board's Report on Schedule K, pp. 958-981.

[17] Cf. below; also Reports of National Industrial Conference Board on Wage Changes in Industry.

Above all, in this relation, I would emphasize the organization or orderliness of the business. The Industrial Council, representing well marshaled forces on both sides, settles through itself or through the regional councils the wage problems for the whole British wool-manufacturing industry, provides arbitration of industrial disputes in a semi-judicial method, and supplies a common meeting ground for the representatives of both capital and labor which under wise guidance by a clear-headed few seems to have been made the opportunity for the attainment of mutual understanding.[19] Contrast to this the condition in the American industry, with the lack of any adequate association on either side, with no

---

[18] This program, the adoption of which was probably furthered by the industrial depression in the British manufacture, was naturally that of the employers, the purpose being to give them a firmer basis for forward quotations than if the original scheme were followed strictly. Altho the cost-of-living index was (August 1, 1921) at 230, the workers are to receive a bonus of only 105 per cent above base rates (time workers). If the index falls below 205, the bonus drops by stages of 10 points.

[19] The nicety, or absurdity, to which wage agreements in the industry are carried is observable in the figures for cost-of-living bonuses of Saddleworth time workers — one example from many:

Males 13–16 years of age	67.351778
" 16–19 " " "	78.498024
" 19–21 " " "	89.486166

On the other hand, real orderliness in the woolen spinning branch of the industry has been enhanced through the development by representatives of the Industrial Council of piece rates in that trade.

opportunity for the interchange of opinions, and with no directing agency or body. Even wage changes have in most mills been stated in such a manner that the ordinary operative would have considerable difficulty in forming an independent judgment as to whether the movement of his wages has or has not kept in step with the changes in prices.

Besides the clarity of the British wage arrangements, making for industrial peace, there is the further advantage to the British wool manufacture that by reason of the particular method whereby actual wages are now determined — by ratios of pre-war rates tied to the cost-of-living index number, and adjustable monthly — the wages bill has decreased and will decrease with every considerable betterment of the British economic situation, whether the modification of the post-war speculative mania, the elimination of monetary depreciation, or the readjustment of general European conditions. American wage reductions will be fought by the labor unions and nothing but industrial depression of an unmistakable sort will enable the employers to win their point. In England, after a sufficient decline in the cost of living, the presumption is in favor of the manufacturers; labor must show cause why wages should not be reduced in accordance with the prearranged system.

On the other hand, to be sure, provisions attached to the wage agreements covering various branches of the British wool industry specify that wages shall not decline, whatever the course of general prices, fully to the pre-war level — labor shall register a net gain when the normal post-war conditions have appeared.[20] This aim is to be secured, as in the case of the well-deserving woolcombers, by means of special percentages upon the pre-war or base wages which are agreed by both sides to be permanent and independent of the "cost-of-living wage." In other cases, as that of the dyers, it is provided that after a certain point is reached wage reductions shall not be proportionate to decreases in the cost of living, but somewhat less — specifically in the dyers' case, in the ratio of .8426 to 1. Arrangements such as these, which have become general through the British industry, do not, however, seem to be held sacred in all circumstances. In the last wage agreement, 5 per cent of the previously granted 15 per cent "permanent" advance was withdrawn. At best, then, assuming both the United States and English returned to the pre-war level of prices, the decrease in the British advantage in wage rates will not be great.

---

[20] Beyond the gain through the shortening of working hours from 55½ to 48, without a decline in time wage and with a pro rata increase of piece wages.

II

The experience of the American wool manufacture in the decade 1910–20 differs in some respects rather sharply from that of the British industry. During the first few years American producers were enjoying the protection of the Payne-Aldrich tariff rates, rates which by their height had almost immediately aroused criticism. The change to lower duties in the Underwood tariff had been hardly accomplished when the European war broke out. The new duties on wool cloths had then been in force only seven months. What the ultimate effects of these lower rates would have been upon the industry is difficult to estimate. In my opinion, they would have put American manufacture to a severe test, and while the industry as a whole would by no means have "gone to pot," some sections of it would have had to curtail operations or shut down completely.[21] From that time to the recent general business depression, the industry found its path one of ease and prosperity. The dividend rates of many wool companies, such as the American Woolen or the Arlington Mills, are of themselves sufficient evidence. Contributing to this situation have been the absorption of Europe in war, the increased natural protection of higher freight rates, the general rise in prices, and the opportunity to supply certain neutral markets; not least, the extraordinary demand for military cloths by the United States government after our entrance into the conflict. Even after the conclusion of armistice and peace, the insistent demand for goods had sufficed up to the middle of 1920 to sustain the industry notwithstanding the increased importation of wool products from England and more recently the Continent. Accordingly, while the British industry was being tried and tested in the stress of wartime exigencies, the American had the ease of abnormal prosperity. Despite many divergent circumstances, one is struck with certain forcible resemblances of the present with the post-Civil War period. During that struggle also, northern woolen mills had enjoyed exceptional prosperity. New mills were built, the capacity of old ones enlarged, and various cotton mills were transformed for the production of wool fabrics. With what result upon the tariff? Before the war our wool manufacture had survived, and, I believe, had been content under tariffs of 30 and 24 per cent on manufactures, with a similar duty on the raw wool during the greater part of the time; but in 1865–66 the domestic producers organized and practically dictated the Woolens Act of

---

[21] I have in mind particularly the production of the finer fabrics and specialties, and the prosecution of some specialized branches of the worsted industry. A case has

come to my attention where an experienced wool-comber and top-maker sold his plant outright after the first few months of operation under the 8 per cent duty accorded to tops by the Underwood tariff. A proper adjustment of rates of semi-manufactured articles would probably have saved considerable confusion and disruption in the worsted industry.

1867, to that time the highest sort of Schedule K that had been enacted. What should one expect at the present time?

In answering this question, attention must first be given to the expansion of productive capacity on the part of the American industry. It has been one of the outstanding features of the last decade and particularly of the war period, and seems to have outrun the broadening of the market for domestic wool goods.

The expansion of manufacturing facilities has been particularly great in the yarn-producing sections of the industry. While weaving capacity has increased at most 15 per cent, the number of woolen spindles has increased over 25½ per cent, French-system worsted spindles 65 per cent, and worsted frame spindles nearly 25 per cent.[22] The surprising growth in these sections of the industry, over and above the growth in the weaving section, is in considerable part attributable to the increase of the knit-goods industry, which itself produces little wool yarn for its own consumption. But there are other features connected with that growth which are apparently not as propitious for the industry as even the spread of this partly competitive manufacture.

It will be noted, for example, that the number of woolen spindles has increased faster than that of the

---

[22] Statistics taken from the Census show the following:

Machines.	1909	1914	1918 (July 1)
Woolen carding sets (including shoddy cards)	6,399	6,245	7,229
Combing machines	2,120	2,425	2,347
Spinning spindles:			
Woolen	2,156,000	2,080,000	2,706,000
Worsted mule (French)	423,000	670,000	699,000
Worsted frame (Bradford)	1,329,000	1,558,000	1,642,000
Looms:			
Broad (50 inches and more)	54,000	57,000	62,000
Narrow (less than 50 inches)	19,000	19,000	18,700

preparatory machines, woolen cards. Similarly, but with a greater disparity, while worsted spindles have as a whole expanded a third since 1909, combing machines have increased but approximately 10 per cent.[23] Such statistics suggest a trend toward the spinning of substantially finer yarns in the last decade. The production and use of such yarns are less satisfactorily fitted to American conditions than in the case of coarser yarns. In the manufacture and employment of fine yarns, greater care and labor per unit of output are required, other things being equal. Scouring must be carried on more carefully and combing more slowly. Drawing can be accomplished perhaps only with the introduction of added operations, the speed of spinning spindles must be lowered, and that of the loom modified. All along the line, higher counts mean added difficulties.

Again, there seems to be some duplication of equipment. The statistics show a sudden reaction toward the woolen manufacture after 1914, the more interesting because preceding decades had witnessed a fairly steady and quite decided decline in the position of that branch of the industry. The recent increase in carding sets and woolen spindles is to be explained in large part, of course, by the military demand for woolen fabrics, but in lesser measure by a renewed public desire for such goods.[24] At least, there has been a considerable exten-

[23] Moreover, with the special expansion of the French system, a considerable proportion of the added combing machines must have been of the Continental type, of which the productivity is only about a third that of the standard Noble comb. Some allowance must, on the other hand, be made for the slower consumption of tops by the French-system spinning processes; for the employment of tops imported more freely under the relatively low (8 per cent) duty of the Underwood tariff; and something may be allowed for the greater productivity of combs in the commission combing establishments, which have grown materially in the last decade as compared with the same number of combs in integrated plants. However, with all allowances, the general situation — spinning equipment outrunning preparatory equipment — is sufficiently obvious, or in other words greater attenuation and more twist being given the average yarn. It should be added that the increase in wool consumption closely approximates the increase in preparatory machinery.

[24] To be sure, the increased demand for cloths of woolen texture has in part been met by an extension of the manufacture of worsted-warp and woolen-weft fabrics.

sion of woolen spinning capacity at the same time as the large expansion of the worsted equipment, or closely following upon it. Inasmuch as most textile machinery wears out slowly, it is probable that a manufacturing capacity more than adequate for normal demands will persist for some time.

The particularly large increase in the French or Continental system of worsted yarn manufacture, to be observed in the above figures, is a further factor of questionable advantage to the American industry as a whole. To be sure, it gives a diversity to the American industry which even the British worsted industry lacks.[25] But the production of worsted yarns on this system is carried on by methods substantially different from those employed in most successful American industries. The type of wool chiefly employed, the greater care with which combing, drawing, and spinning must be prosecuted, and the general use of adult male spinners, all are adverse factors. The product is a soft, full yarn, lacking the firmness and strength which are imparted to the yarn in the Bradford worsted process. Their utilization in weaving is consequently hedged about with greater care and slower speed — conditions not propitious for an American industry. They have found employment, except insofar as used in the knit-goods industry, mainly in the production of the best grade of fabrics, such as fine, soft, drapey dress goods.[26] Finally, it should be noted that foreign competition — competition from the Continent — will presumably be strongest with respect to products of this Continental system, the mule-spun yarns and the soft, superior Continental cloths. In sum, I fancy this recently expanded branch of the wool manufacture to be the portion with the least competitive strength.[27]

---

[25] Less than 5 per cent of British worsted spindles are of the Continental or mule type.

[26] Typical are the productions of the Passaic mills started years ago under German management. It may be added, moreover, that of our best dress goods a competent British observer recently stated he had seen none superior from any part of the world.

Finally, it is probable that the increase of the industry's productive capacity even in its most restricted sphere has outrun the available market under normal conditions. There has been an increase of weaving capacity of from 10 to 15 per cent — taking into account both the increase in the number of broad looms and the spread of automatic looms — at the same time that knitted fabrics such as jersey cloth have been making extensive inroads into the field of woven wool goods and that the cotton industry has continued its encroachments on the same domain, as in the more extensive production of palm beach suitings.[28] It is a serious question whether such expansion is warranted by the growth in our population or the enhancement of our normal purchasing power.

Taking the whole matter of capacity into account, then, it is obvious, I believe, that all is not well. There has been a duplication of yarn-producing equipment which in mills carrying on both branches of the industry will lead to higher overhead charges through idle machinery, and which among specialized mills may easily lead to such severe competition as to eliminate profits from all but the more efficient establishments. Again, there has been a growth in weaving capacity beyond the probable normal demand for cloth, and particularly there has been a tendency toward the manufacture of finer goods. While the action of certain of these factors might in time, with the growth of our market and the scrapping of obsolete machinery, be substantially modified or wholly eliminated, at present all are provocative, as after the Civil War, of complaints on the part of domestic manufacturers and of a susceptibility to see in any importations whatever a grievous injury to American industry.

---

[27] The Continental system is not really a newcomer in this country, dating at least from the early or middle eighties. It could hardly be termed an "infant industry." Still one should not be too exacting when attempting to put a time limit on infancy in industry. Mr. Taylor, representing the National Mohair Growers' Association, recently stated to the Ways and Means Committee: "I am before you today representing the infant live-stock industry of America. We by actual figures and count are only 71 years old." Hearings on General Tariff Revision, 1921, p. 2691.

[28] Such abnormal circumstances as the temporarily increased purchasing power of certain classes in the last year or two, or the decrease in demand due to the abbreviation of women's skirts may be disregarded.

In the character of the technical equipment, of which some features have been mentioned above, there has been no great change in the American industry during the last ten or fifteen years, with the exception of the automatic loom. Apparently now as then we possess some advantages and some disadvantages. The arrangement of the American factories is probably superior on the whole to that of British mills, with a somewhat greater edge in the case of the worsted mills than in that of the woolen factories.[29] American mills make more use of gravity and forced drafts for the conveyance of loose wool. The felting of the wool on account of which the British object to the forced-draft method of conveyance is not of sufficient moment for the greater bulk of our production to prevent the installation of such systems. On the other hand, the better British mills make use of carding machines which are wider and better constructed than our own. The woolen mules also appear of superior construction. We have no weaving mechanism which is equal to the British overpick loom for the production of plain fabrics. Our box looms, on the other hand, are as above stated identical in character for the most part to the similar loom so widely used in the British industry—they seem as well made, and our manufacturers run the machines at somewhat higher speeds. And so it goes from section to section of the industry. On the whole, I would regard the American manufacturing equipment as equal to the British, but not superior to it even considering the present state of the automatic loom in the two countries; while the outlook for the future through progressiveness leans distinctly in favor of the foreign industry.

---

[29] In worsted we imported a British-bred manufacture, but our woolen manufacture "just grew."

In the working of the mechanical equipment the American industry has an appreciable advantage. The greater effectiveness of the American manufacture is in part the result of somewhat better organized production, more attention to routing and the like; and in part the result of production on a larger scale in most branches of the industry — of which more later. With regard to the human element it is more difficult to speak conclusively. In certain portions of the manufacturing process, as for example, scouring, combing, drawing, and possibly carding and pressing, there is little difference to be discerned between American and foreign labor efficiency. The processes require chiefly semi-mechanical machine minding, and any advantage on either side of intelligence, inheritance, or training has little play. In weaving we seem to have the upper hand, probably in a measure at the expense of quality in product. Our manufacturers are able to push their workers somewhat more, with the result that more commonly here than abroad weavers will tend two, three, or even four looms (of the non-automatic type). In many of the finishing operations, however, the foreign workers, especially the English, have the advantage, probably in quantity and surely in quality of production, since there experience is of peculiar value and in experience the foreign worker far overtops the American.

Whatever the variation in skill and efficiency in the several sections of the manufacture, it is, I believe, incontestable that the net advantage, even in the more favorably situated portions, is insufficient to counterbalance the higher scale of wages paid in the domestic industry.[30] Comparisons with foreign wage scales, and especially with those of the Continent, as of the present time, are difficult to make, and almost impossible to make accurately. However, certain general estimates may be taken to show the trend. Statistics pertaining to British wage rates of late 1919 and early 1920, published by the United States Tariff Commission, indicated that in most cases the wage rates in England were from 45 to 50 per cent of American rates.[31] Since then the movement of wages in the two countries has not been dissimilar, and I should expect to find roughly the same results were another comparison along such lines to be made today.

Another method of approach is that of wage changes since the pre-war period. The English total rates reached their maximum elevation in December, 1920, when most time workers were to receive 216¼ per cent more than they had been receiving in July, 1914 (with a maximum advance of 60*s.* 4½*d.* where such a maximum applied); the great proportion of male piece workers, 223½ per cent more; and most female piece workers, 232½ per cent more. Since that time, on account of the decline in the cost of living in England and of the new wage agreement, the ratios have decreased, until according to the last reports available the per-

[30] This disadvantage of the American manufacturer is the more obvious since many occupations of the wool-working mill are paid at piece wages, and these rates are much higher. Greater effectiveness of the workers in such cases would, of course, affect only the distribution of overhead.

[31] Report entitled A Survey of the British Wool-Manufacturing Industry, pp. 56–65. Wage rates for Great Britain were converted in this Report at the par of exchange; but I have here made allowance for the depreciation of the pound sterling which existed at the time these wage rates were secured.

centages for the three groups above mentioned were, respectively 125½, 135¼ and 141½ per cent.[32]

Exactly similar American figures are not available, and the best and most recent ones seem to be those compiled by the National Industrial Conference Board. The most comparable figure of the Board's report [33] is that of hourly earnings. The index figure of such earnings for men showed a rise of 203 per cent by June, 1920, and it remained above 200 per cent until December of that year, when it slid off two points. For women, the peak reached was 228 per cent, in June, 1920; but that rate was for the month only, and in the latter part of the year it too averaged around 200 per cent. Since the end of 1920 there has been a general decrease of 22½ per cent based on the workers' total wages, presumably bringing down the percentage of hourly earnings above the base of September, 1914 to around 132½ per cent for both men and women.[34] Despite the failings of the method of comparison here utilized, it is obvious that as far as relative wage scales are concerned, the American industry has at least gained nothing during the war and post-war periods. The disadvantage in wages under which the American manufacturer proceeded in 1914 — we have no accurate comparison even in the report of the Tariff Board — has been maintained or even increased in more recent years.

---

[32] Based on data as of the middle of September, 1921.

[33] Research Report No. 35 of the National Industrial Conference Board, Wage Changes in Industry, September, 1914–December, 1920, pp. 18–21.

[34] Incidentally it may be noted that the increase in hourly earnings was greater for the wool-manufacturing industry than for any other reported in the Board's Report; also that the cost-of-living index as given by the Board showed an advance of only about 90 per cent when the index of hourly earnings for the wool manufacture was around 200 per cent above 1914. These facts suggest one of two things: either that the industry is lenient about its wage advances, or that through lack of organization the industry is under a severe handicap as compared with other industries of the country. In this latter regard, the influence of one or two of the more efficient firms, like the American Woolen Company, in setting the pace for wage advances seems to have been a disadvantage to the industry.

Comparative wage scales alone do not, of course, tell the whole story, any more than comparative excellence in mechanical equipment by itself. Already reference has been made to modifying factors, such as the administrative ability of American manufacturers, and to the relative initiative and skill on the part of American and foreign operatives. Further factors to be taken into account are comparative scale of operations and variance in form of organization. These can but be touched upon here.

The operation upon a larger scale in this country, speaking generally, both in the worsted and woolen branches[35] is of advantage to that industry mainly by reason of the standardization or quasi-standardization of product which has taken place to a notable degree in our manufacture. A conspicuous case is that of the Fulton serges, one of which, No. 3194, is used in the trade as a sort of foot-rule to measure the general fluctuations of wool cloth prices. Such goods, usually constructed in medium or medium-fine quality and of plain colors or conservative designs, may be secured in any bulk desired, are always substantially uniform in quality, color, and finish, and have filled in the past a wide and fairly constant demand from our consuming public. The virtual lack of such fabric production in other countries may, with such other factors as assurance of delivery, of "repeat," and credits, account for the alleged disappointment of cloth buyers who in 1913–14, anticipating the new lower tariff, journeyed to Europe and returned without placing any considerable orders.[36] In addition to fitting American requirements so closely, the production of such cloths in our mills is undoubtedly carried on with maximum effectiveness. Under such conditions the 35 per cent duty levied by the Underwood tariff would be much more valuable to American manufacturers than if our output were of the common European type. It may be added that in so far as our industry has departed more recently from the production of fabrics of that type under such conditions, its competitive position has, it seems to me, been weakened.

---

[35] The disparity in size of operations between this and European countries is greater in the case of worsteds than of woolens, altho in certain instances, such as the specialised woolen mills of the American Woolen Company, the relation is about the same in the two branches.

[36] Reports in textile periodicals at the time. See also the recent account in testimony of Mr. William Goldman, representing the National Clothiers' Assn. of America

The second modifying factor above mentioned, difference in form of organization, applies chiefly to the worsted branch of the industry.[37] Here again the decision seems to depend upon the quality of fabric manufactured. In the case of the finer grades of goods, some net advantage seems to inure to differentiated European industries. There is the possibility of greater individual attention to blending or design; the probability of superior quality in the semi-manufactured articles; the possibility of more careful watch over manufacturing niceties; and similar features. In the bulk manufacture of medium-grade fabrics, on the other hand, integration of the American sort appears to enhance competitive strength.

The road to improvement in competitive strength in the American wool manufacture seems hedged about with difficulties. Certain basic conditions, such as the nature of the wool fibre[38] and the general levels of wages here and abroad, are of course, beyond the power of the wool manufacturers to modify. Accepting them as either fixed or at best slowly changing, one might look

before Ways and Means Committee, Hearings on General Tariff Revision, 1921, pp. 2650 seq.

[37] The woolen branch is integrated in all countries; but some comparison might be made as to the degree of specialization in each. The average difference is not great.

[38] Cf. Taussig, Some Aspects of the Tariff Question, pp. 357 seq.

for more immediate progress in any of at least three directions: improved technical equipment, more closely regulated wage conditions for the wool manufacture itself, and the extension of standardized production.

Students of the wool-manufacturing industry will recall that the period from the introduction of the early English equipment (especially 1790–1800) to about 1840 was one of extraordinary technical advance, in which American contributions played no inconsiderable part. Such contributions included automatic machinery for the manufacture of card clothing, the cylindrical shears, the cylindrical press, and especially the ring doffer, a device of almost revolutionary importance.[39] By the end of that period, the mechanical groundwork of the present industry had been laid so far as the woolen branch is concerned.[40] Subsequent advances in this branch of the American manufacture have consisted in part of increasing the size of the original machines and in part of sporadic inventions, such as the automatic feed for carding machines and the open-shed loom. Development abroad has been along the same lines, inventions of no greater importance taking the place of those just mentioned for the American industry. One cannot say that the part played by the American manufacture has been wholly passive in this latter period — merely the acceptance of foreign developments; nor on the other hand that it has been one of superior progress as compared with that of the foreign industries. And in this relation the future does not promise any amelioration, but rather the reverse, in view of the keener interest being taken especially by the British and Germans in technical inquiry.[41]

[39] Lacking it, the woolen branch of the industry might well have developed drawing operations similar to those still retained by the worsted branch.

[40] There was practically no worsted production in this country at that time.

[41] On account of relatively direct methods involved in the woolen branch of the industry, there is little or no probability of alteration through the elimination of any

The worsted branch of the American industry has had an essentially different history. Until the 50's, it existed only as a handicraft manufacture of negligible quantity. After the invention abroad of the mechanical combing machines, the worsted yarn manufacture, at first of the English type only, was imported into the United States and set up in the factory form; but it was imported *in toto* and with a well developed technical equipment. Later, in the 80's, when the Continental system was first introduced, it was brought in with an even more highly developed technique. Since their importation, the methods and equipment of worsted yarn production have received no important change originating on this side of the Atlantic. Even increases in the size of machinery have come chiefly from abroad, because of the relatively late development of worsted machine building in the United States.[42] For the Bradford system this means passiveness of nearly three-quarters of a century, and, as already intimated, the Continental system cannot continue to qualify as an "infant industry." The reasons for this imitativeness are uncertain: whether the spell of the British or Continental precedents, the influence of the proprietors and foremen of foreign birth who always have been more numerous here than in the woolen branch, the lack of an adequate and stable machine-building industry, or a complacency fostered by a high tariff wall, particularly favorable to worsteds, and a rapidly expanding domestic market.

---

existing steps in the manufacturing process. Advance would be looked for along the lines of improvements such as frame spinning of woolen yarns, of a better understanding of the processes, their perfection, saving in materials through reduction of wastes and of imperfect goods, and the like. Much remains to be done in such particulars.

[42] The recent development of the automatic box loom for the joint weaving section of the two manufactures, tho of more immediate value in worsted weaving, is the product of the machine-building industry rather than of either branch of the wool manufacture.

Another possible alternative, of course, is that improvement *could* not have been made in the last half-century. Indeed, a British worsted spinner of prominence said recently of the present worsted-spinning equipment that "so far as machinery in principle is concerned, we have gotten to the limit of invention";[43] and it is true that abroad as here such equipment has not been changed in principle in recent decades. Unlike some other industries such as coal mining or steel working, the chief textile manufactures all seem subject to diminishing returns so far as technical improvement is concerned. No country has in the last twenty years been making an advance in wool, cotton, or silk manufacturing technique comparable to that made fifty years ago; and at least for the wool and cotton industries the advance has been far less than made a century ago. However, in view of some of the developments in the British industry in the last decade or so, and the progress that has been made in recent decades in minor American textile industries such as knitting and carpet manufacturing, a real stagnation seems improbable. An abbreviation of the tedious gilling and drawing operations in the worsted process, one would hope, must some time be devised, and the world is waiting impatiently for a reformation of the wasteful and noisy weaving operation.[44]

At all events it may be said (reverting to our main topic) that scientific investigation has been going forward or is going forward much more rapidly in foreign countries than in the United States. Even inventions or improvements coming from our manufacture, if of an isolated variety, would have little permanent effect on the comparative strength of American and foreign industries, since in these days improvements cannot be kept secret long. Only steady and unremitting endeavor along such lines would avail, and our manufacture is not in the position or spirit to make that endeavor. The leading organizations in the American industry show no interest in the deliberate promotion of research and invention, and our textile journals, presumably following the tastes of their clienteles, devote little space to the matter. None of the interest and activity along these lines which seems to infuse, say, the British manufacture is apparent in our industry. Accordingly we can hardly anticipate that future progress in technical equipment will emanate from American sources; we can hardly hope for increased competitive power in our manufacture from this quarter.

---

[43] Journal of the Bradford Textile Society, July, 1917, p. 26.

[44] The Belgian system for manufacturing semi-worsted yarn, which eliminates combing, is an illustration of what perhaps could be carried further in worsted yarn production; and numerous experiments have already been carried through in attempted reformation of the present loom. Col. John P. Wood, appearing before the Ways and Means Committee recently on behalf of the wool-manufacturing industry, indicated his belief that self-sufficiency in that manufacture could only come "by some revolutionary discoveries and machines which are not yet in sight." Hearings on General Tariff Revision, 1921, p. 2577.

Advance through a better control of wages in the wool manufacture itself is possible only by means of increased coöperation among American manufacturers. As long as competitive bidding for employees exists, wages are bound to be maintained frequently at unnecessary heights. Some rather informal understandings have, to be sure, been created at times in the past among mills in certain localities, but these have not had sufficient strength to be very effective.[45] The wool manufacture in this country is not as definitely localized as that of Great Britain, but the greater portion of it could, I believe, be satisfactorily organized. However, at best advance along this line would be only a palliative. The general level of wages would be little affected, and the American industry would still be compelled to pay substantially higher wage rates than most foreign manufactures.

---

[45] It is perhaps a matter of regret that the National Association of Wool Manufacturers did not lead the way in this matter when in 1919 it had an opportunity. No doubt there were various reasons why that Association might hesitate.

The third possible path of advance, that of standardized production, as above noted, has already been extensively traveled. Some further progress is undoubtedly possible. Standardization of tops and yarns could come from within the industry and would facilitate manufacture so far as the American production is or becomes differentiated. Standardization of cloths is in large part dependent upon the vagaries of popular demand. Moreover, it may be noted that one force making for large-scale production in these standardized or semi-standardized goods, that of demand from the wholesale clothing trade, is not likely to be much strengthened in the future, except by the growth of population and like slow-moving factors. Indeed, it is much more probable that the next decade will in this regard yield a further advantage to our competitors, England and the Continent, through the increase in scale of their representative woolen and worsted enterprises consequent upon the extension of their ready-made clothing industries. In this matter, then, the American mills can do little more than adhere as far as possible to the standardized or semi-standardized goods already developed, permitting novelties and the finer grades of fabrics to come from abroad. Surely competitive strength cannot increase either in the individual mill or in the industry as a whole if production is permitted to run the "ranges" and patterns, to fritter its energies in relatively small orders, and to attempt the fine workmanship of the leading Huddersfield or Bradford establishments. The closer American mills cleave to typical American manufacture, the stronger will be the industry as a whole.

What conclusion can be reached, having regard to the conditions above outlined, in the field of tariff policy? It appears that, tho there are possibilities of greater competitive strength in the American wool manufacture, the probabilities of effective advance are not great. Little is being done to put the domestic industry in the way of progress, either in the matter of technical improvement or of wage control; nor is effort being made toward the standardization of those articles — such as tops and yarns — in the development of which the industry as a whole might have influence. The deductions to be drawn from these general conditions of possibility and probability obviously will differ sharply according to one's economic or political faith. For one who views with regret the indefinite maintenance of tariff aid for any industry which shows no real prospect of ultimate self-sufficiency, the situation is discouraging. He cannot recognize in the wool manufacture as valuable a member of the body economic (if one may use the phrase) as the majority of our more important industries. On the other hand, for the protectionist who believes that domestic industries, whatever their competitive strength or future prospects, should be given the amplest support against the cheaper-working foreign manufactures, the details and the exact measurement of the comparative disadvantage in the American wool-using industry are of no consequence. It suffices for him that there is real and apparently permanent disadvantage. And to him the case is conclusive for the continuance of a system of duties on woolen and worsted products substantially like that which has been in force during the last half-century.

ARTHUR H. COLE.

HARVARD UNIVERSITY.

REVIEWS

CHARLES RIST ON GERMANY'S WAR FINANCES

PROFESSOR RIST's new book [1] is a notable survey of an important subject. True, the time is not ripe for an exhaustive study. Essential German data are not yet available. Intensive studies by competent German economists must precede a complete and perfect appraisal. We are yet too near to the war, too much under the influence of the war's emotions, to attain at all points the truest perspective. But we need, while the experience is still fresh in our memories, competent preliminary studies of war-time policies and theories — those of belligerents and neutrals alike; the more because so many lessons which it should teach are sorely needed in the painful return to normal conditions. Such a preliminary study Professor Rist has written; it is the best which the reviewer has seen for any country, and, for its intended readers, it will rank as a model of its kind.[2]

The book is an outgrowth of the writer's activity as an associate of Professor Lichtenberger in editing war documents. In this capacity he followed, day by day for four years, the course of events in Germany and the expressions of German economic thought. Probably no one today, at least outside of Germany, can speak with equal command of the relevant literature. Furthermore, as economists do not need to be reminded, Professor Rist approached his task with the invaluable background of an intimate understanding of the

---

1. Charles Rist, Les Finances de Guerre de l'Allemagne. Payot et Cie, Paris, 1921.

2. Professor Gaston Jèse has published several installments of an excellent treatise on French war finance which is more exhaustive and therefore more valuable for the student of public finance, but hardly the equal of Professor Rist's in incisiveness, balance, and interest.

development — and vagaries — of economic thought over the past century and a half. The novel and peculiar problems of the war brought about, in every country, a continuous struggle of conflicting theories, and the right ones did not always triumph. Hence the analysis of economic opinions must be an integral part of any comprehensive examination of war policies. Readers who know Professor Rist only as a historian of economic doctrines will find him no less competent as a critical reviewer of facts and policies in a field where assembling, selection, and exposition of data constitute a task of no small magnitude.

The book is avowedly written for a French public. As the author writes in his preface:

> [Germany's finances] will have, for years to come, too direct a bearing upon French finances for a Frenchman to neglect them. Their history during the war gives the key to their present situation. This is the excuse for this book. I have made no pretense of instructing specialists in the science of finance. I have had primarily in mind a public which has a right to be informed upon questions which concern it so closely.

He seeks especially to enlighten French public opinion upon the fallaciousness of certain economic and financial doctrines, particularly in the realm of money and foreign exchange, "which the calmer reflection of years of peace had shown to be inaccurate and dangerous." He is frankly disturbed by the strength of mercantilist opinion in France, with its narrowly nationalist policies, its "old protectionist pharmacopeia," its tendencies toward thorogoing government regulation. "For France in particular," he believes, "that is the road to ruin." Professor Rist's analysis, however, should be widely read outside of France. Altho France may be the country most vitally concerned in Germany's future financial policies, and may be peculiarly exposed to the contagion of false doctrines "made in Germany," no student of affairs can question that the policies and progress of Germany and France in the next few years will profoundly affect the progress and policies of the rest of the world, especially the great exporting nations; and no competent observer abroad, even in Adam Smith's land, can afford to cast stones at French and Germans as one who himself lives in a land of right thinking.

The book is brief, clear, well proportioned and couched in simple, charming French. It is to be hoped that translations will be made available for the large intelligent public who command only a single tongue. Economists will especially appreciate the guide to the literature of the subject which the footnote references provide; and many other readers will enjoy the footnote comments no less than the text. After Mr. H. G. Wells' popular volumes on the history of the world, surely the day is past when it is necessary to omit or apologize for footnotes in a book intended for a wide circle of readers.

War finance, as most of us realize more clearly than we did ten years ago, is not a simple matter of public expenditures, taxes, and loans. It involves important banking policies, as well as regulation of trade, foreign exchange, commodity prices, and security issues. It ramifies through the whole economic organization.

Professor Rist's study throws this fact into bold relief. Little space is devoted to expenditures, and two chapters out of eight suffice to deal with loans, taxes, and the budget, except so far as these figure again in the brief discussion of the fifteen months after the armistice. Half of the book, the better half indeed, is concerned with finance in the sense of banking, currency, and exchange — pre-war banking preparations, financial mobilization at the outbreak of the war, currency inflation, Reichsbank policies, the depreciation of exchange and attempts to check it. The Reichsbank occupies the center of the stage. The government policy as such, linked with Helfferich's name, incurs the author's criticism; the Reichsbank policy under Havenstein's leadership, on the other hand, he regards as on the whole ably conceived and masterfully executed, brought to grief only by the "indefinite prolongation of hostilities, crowned by the military debâcle and the revolutionary crisis."

The opening chapter furnishes support for those who account Germany the arch-plotter of the war. Clearly her leaders looked forward to war and made plans to meet the exigency. After the Kaiser-humiliating Agadir crisis in 1911, in obvious anticipation of an early return of such an emergency, measures were promptly taken to put the financial machinery in readiness to stand the shock of war. Most of these were banking "reforms," justified in some degree on commercial grounds but in the main as essential to meet the threat of hostilities. Under the influence of the president of the Reichsbank, the big banks practically discontinued short time borrowings abroad, the dependence upon which had been a seriously restraining influence in 1911. Pressure was exerted, tho with less success, to force the joint stock banks and private banks to strengthen their reserves. With the aid of emergency taxes imposed in 1913, the government war chest at Spandau, formerly 120 million gold marks, was trebled by the addition of equal quantities of gold and silver. The Reichsbank extensively increased its gold reserves: considerable purchases of gold were made at a loss; still more was absorbed from circulation by expanding the issue of small bank notes, encouraging private issues, and stimulating the substitution of paper for gold in payments by private companies and the railway and postal administrations. So successful were these efforts that the Reichsbank balance sheet for July 23, 1914, showed a reserve of 93 per cent of the outstanding notes, and a legal margin of issue of 3,358 million marks — both figures large beyond all precedent. Meanwhile financial experts worked out detailed programs for financial "mobilization" to be filed with the plans for military and naval mobilization.

The experience at the outbreak of war justified the care in preparation. The Reichsbank promptly assumed the rôle of a state war bank. Into its coffers the Spandau chest emptied its treasure. The discount rate, altho raised by one per cent each on July 31 and August 1, was only 6 per cent at its maximum. Loans were freely made to individuals and companies; private bills in the Reichbsank portfolio increased from 751 millions to 2980 between July 23 and August 15. On the latter date, discounted treasury bills reached 1446 millions. Notes and deposits rapidly expanded accordingly, but so well did the reserves keep pace that the ratio of metallic reserves to note issue did not fall below 36 per cent in these early months of the war.

The war loan banks (*Kriegsdarlehnskassen*), legally separate from the Reichsbank but virtually directed by it, began on August 8 to make advances on a wide variety of securities to merchants, industrial establishments, commercial and savings banks, coöperative credit societies, and individuals, eventually becoming bankers to the states and municipalities. Their notes (*Darlehnskassenscheine*) served partly as additional legal tender currency but even more largely, in time, as elements in the Reischsbank reserves: as it authorized loans by these institutions, the Reichsbank exchanged its own notes for war loan bank notes and then held in its vaults such amounts of these as it needed to maintain the legal reserve ratio. It is a remarkable commentary upon the German mentality that this farcical procedure of maintaining a legal reserve could be gravely kept up until the present year. The war loan banks furnished a convenient supplement to the operations of the Reischbank and joint stock banks, relieving the ordinary banks from the necessity of extending their loans, as happened generally abroad, to meet the special needs.

Thanks to these measures for indefinite expansion of currency and credit, Germany was able to avoid resort to a general moratorium, and exhibited, two months after mobilization, the appearance of "an almost normal financial situation." Various partial moratoria were, however, established, and Professor Rist thinks it doubtful whether Germany gained more than an empty boast by avoiding the moratorium which was so commonly established abroad. None the less, the financial mobilization at the beginning of hostilities must be regarded as distinctly successful.

The German government's own loan policy was simple in the extreme. Regularly twice a year, with true Prussian precision, loan campaigns were launched to raise, on substantially uniform terms, unlimited amounts of 5 per cent war loan bonds. The nine loans yielded 96 billion marks — a success which astonished the Germans themselves and led foreign observers to question the genuineness of the procedure. Professor Rist, however, denies that the success was illusory, and is at pains to explain how such quantities could be derived from genuine savings or liquidation of assets. On the one hand, it involved the diversion to war uses of the huge annual savings which Germany had previously been exporting or transmuting into permanent physical form at home. On the other hand, it necessitated maintaining a free flow of liquid assets and a constant readiness to invest them. The story is interesting and significant. Between the loan issues, furthermore, funds were provided by successful appeals to banks and capitalists to absorb treasury bills, which were subsequently accepted in payment for war loan bonds. How far short of complete success were the loan campaigns is indicated by the fact that at the time of the armistice, shortly after the issue of the ninth loan, the floating debt amounted to 45 billion marks, nearly half the amount of the funded debt.

The main features of the German war budget policy are well known — to maintain by taxes the equilibrium of the ordinary budget, kept artificially at substantially the figures of 1914; to throw into an extraordinary budget all military and naval expenses, and exceptional expenses of most other types; to cover the extraordinary budgets by loans, to be retired by indemnities imposed upon conclusion of the war; and to increase the tax burden only to provide for interest on the growing debt. Students of politics and public finance will be especially interested in the story of the conflict between the states and the federal government and the eventual centralization of the tax system, to which the pressure for new tax revenues led.

In the discussion of inflation and the monetary policies of the Reichsbank, Professor Rist is at his best in combining exposition of facts with critical analysis of German opinion. How the reserve ratio of one-third was maintained, how the facts of inflation and currency depreciation were denied, how favorable contrasts with French currency expansion were made by neglecting war loan bank notes in circulation, how

Belgian and Polish notes were replaced by German currency, how and why the extension of the check was pressed, how deliberate insincerity was mingled with ignorance — it makes another interesting story.

The chapter on exchange rates, the reasons — actual and assigned — for their fluctuations and particularly the decline of the mark, and the measures taken to correct the depreciation, is likewise an excellently balanced combination of facts well presented and theories critically considered. German treasury and Reichsbank officials insisted that the rise of the foreign exchanges reflected merely the interruption in trade and in financial relations with German's foreign creditors, and in no way reflected upon the soundness of her currency or internal finance. Only a few German writers, such as Lansburgh, editor of *Die Bank*, recognized in print the rôle of the currency inflation and its causes in government borrowing. Hence the comparative failure of measures designed to support the mark — gold shipments, restriction of imports, control of exchange, sale of foreign bills, and floating of loans in neutral countries. Here it is that the available facts are scantiest; but it is clear that the best of efforts in those directions served merely to retard the fall of the mark.

The chapter on war indemnities is essentially a discussion of indemnity theory, first as reflected in German writings and, second, as embodied in the Versailles treaty. Professor Rist sets forth with special approval the views of Lansburgh. As "reparations" to repair the ravages of war, indemnities are useful and may be "an absolute necessity, a condition vital to existence." As reimbursement of war expenditures, on the other hand, they are as dangerous as a feast to a man who has gone hungry for years. In general, German writers accepted unquestioningly the view that Germany must impose heavy indemnities upon her defeated enemies and, that she would profit from them. Their discussions related chiefly to methods of collection. It was easily recognized that payment in specie would be feasible only within narrow limits. Payment in securities came to be accepted as the preferred method, to be supplemented in slight measure by payment in kind. There is no evidence of adequate appreciation by German writers of the conditions which underlie the use of securities. The strange notion that practically unlimited sums could be exacted through the device of security transfers deserves rather more criticism than Professor Rist directly accords it.

In his own consideration of the reparation clauses of the treaty, however, Professor Rist makes clear that he accepts no such conclusion. He agrees with other authorities that German holdings of foreign securities cannot bulk large in the indemnity payments, that her ability to pay in services is materially lessened by the confiscation of her merchant fleet, and that she can pay in specie to only an insignificant amount. He recognizes frankly that Germany must ultimately pay the indemnity primarily by her exports of goods. Hence boycotting German goods, economic warfare, raising high protective tariffs, all operate as limitations upon Germany's capacity to pay; and at best her ability to pay is limited by her capacity for export and the readiness of foreign markets to absorb her products. "The very idea of war indemnity is really a direct blow at protectionism." Yet thousands of Frenchmen, unaware of this inherent opposition, are at once ardent protectionists and loud supporters of a huge indemnity. Valuable as it is, the chapter is unfortunately too short to satisfy the appetite of readers who have fed for three years on the husks of indemnity discussions.

In a study so timely and successful one may overlook the few omissions, deficiencies, and minor slips that were inevitable. The reviewer must confess, however, to one disappointment. There is no chapter in which the author sums up the outstanding conclusions to be drawn from the study, what are the sound principles of war finance which Germany observed, what the unsound principles which she followed to her detriment. Nowhere does he sketch the outlines of a normal program of war finance, under such conditions as Germany faced, or point out specifically the significant bearings of the war-time experience upon post-war policies. Such a concluding chapter, in part a mere summary, would also afford opportunity for critical consideration of such questions as to how far currency inflation was inevitable, and how its evil effects and after-effects might have been prevented or mitigated. For such a chapter one could even spare the necessarily incomplete discussion of developments since the armistice. Adequate treatment of this broader subject will be easier when the war finances of all the leading countries have been carefully studied; and perhaps it is too much to expect it in a preliminary study. For generalizations of this character, it must be said, Professor Rist's volume contributes useful material, and his own conclusions from Germany's experience are often implicit when they are not very specifically expressed.

JOSEPH S. DAVIS.

STANFORD UNIVERSITY.

CASSEL'S THEORETISCHE SOZIALÖKONOMIE[1]

Professor Cassel's book on The Nature and Necessity of Interest[2] established his position as one of the leaders of thought in the field of economic theory. *Theoretische Sozialökonomie* represents the completed program of which the earlier work was an installment, and which, as the author reminds us, was sketched as early as 1899 in an article entitled "Grundriss einer elementären Preislehre." It is properly to be described as a monumental work, and will disappoint none of the high expectations which those familiar with the earlier book and with the author's other previous writings in German and Swedish will approach a systematic treatise from his hand covering the entire field. The main object of the work is stated as the "repudiation (*Abschaffung*) of value theory" and erection of a complete theory of social economy on the basis of price alone.

The general attitude of the work is, therefore, that of "pure theory" of the objective type, but the presentation is nonmathematical. It is characterized throughout by keen analysis, rigorous deduction and carefully accurate statement. The author pays his respects in a short paragraph (p. 21) to the historical and descriptive method traditional in Germany, remarking that economic activity is forward and not backward looking, and consumes little space in justifying the use of hypotheses and assumptions which represent a simplification of the facts of life. His procedure is the familiar and unquestionably correct one of beginning with extremely simplified conditions and adding complications by stages, approaching by successive steps to the intricacies of actual phenomena. And he is fairly careful to state accurately and completely the assumptions with which he is working at any stage, to keep it clear to himself and the reader what factors are assumed to be given and what are variable. In short, the author has, in the reviewer's opinion, adopted the most fruitful method of investigation of theory problems and used it with the highest ability and skill; he has written just the sort of book the reviewer would have liked to write. With this statement as a background it will be permissible in a brief sketch to select for notice mainly from the more important points at which the author's theories, or at least his statement of them, seem open to difference of opinion.

---

[1] Gustav Cassel, Theoretische Sozialökonomie. Leipsic, C. F. Winter, 1918. Pp. xii, 582.

[2] London, 1903.

To begin with, the "repudiation of value theory" is very good, and the writer is altogether in favor of it — for the first stage in the discussion of economic problems. But should it not be kept in mind also that the ultimate object of economic theorizing is a criticism in ethical and human terms of the workings of the economic machine, and that a theory of value as well as price is indispensable? A correct understanding of the mere mechanics of the price system is undoubtedly the first desideratum, and for this purpose it should be described as far as possible in terms which beg no questions as to approval or condemnation but merely show how the system works. For our part the conviction grows that value (*i. e.*, utility) theory is misplaced and perhaps mishandled in the conventional economics, but none the less is necessary. Equally requisite to the human purposes of the science are: (*a*) a pure mechanics of exchange relations, written in behavioristic terms, setting forth the cause-and-effect relations of a system of pure free enterprise, and (*b*) a critique of the workings of such a system, in which value relations are made as explicit as possible and standards formulated on the basis of a sound philosophy of social ethics. The most serious criticism to be made against most of our economic literature is that through uncritically mixing these two points of view the results in both fields are foggy or fallacious. The critique, indeed, which characteristically runs in the form of a naïve apologetics, is largely fallacious. Economists have been too much inclined to manufacture an ethic of their own to suit their special scientific bias, and the resulting quantity-of-pleasure theory is now happily making way for a sounder psychology. Even Mill never understood his own ethical position, which was in reality a thorogoing idealism, forced into the false terminology of hedonism.

Again, Professor Cassel seems rather to put himself out to contrast his position with that of the classical economists, and Marshall in particular. In most instances the reviewer is in sympathy with the author's position: it would have been better to put the matter in the way he puts it. But the real issue is not usually vital if allowance is made for crudity of statement by the earlier writers. Especially it is not necessary to disagree sharply with Marshall in order to agree with Cassel where he is criticized by the latter. As everyone understands, Marshall shows a deliberate preference for cautious, not to say "loose" forms of expression, on the ground that they are more descriptive of reality. The world is like that rather than like the rigorous, sharply definite propositions of the logician. One who disagrees with this conception of the method of theory, as does the present writer also for reasons which it would be out of place to develop here, should still appreciate the force of the argument in its favor. And surely no reader of Marshall's appendices, notably the Mathematical Appendix and his remarks on the use of the mathematical method, can imagine that his literary style was not deliberately adopted or that it resulted from lack of capacity or inclination to reason closely.

At some points also, as in the treatment of the Principle of Substitution, of which both authors rightly make so much in the theory of distribution, Marshall is, of the two, closer to fundamentals. In the discussion of rent, too, Marshall has in substance if not in form much more effectively broken with the older classical tradition and is correspondingly nearer to "sound doctrine." A somewhat broader (and less modest) handling of his notion of quasi-rent by Marshall would eliminate the old doctrine of land rent altogether, except as a limiting concept, and this is undoubtedly what needs to be done. Cassel seems to be unaware that the "differential principle" has long since been shown to apply to one distributive share as well as another and hence to tell us nothing about any of them beyond the nonsensical statement that one factor gets what is left of the product after the other factors are paid, and also that when stated in a form to avoid this truism it is identical with the principle of imputation which he rejects.

This doctrine of imputation or distribution on the basis of specific contribution to product is treated (pp. 88, 89) as resting on the same foundation as the doctrine of marginal utility, which is summarily disposed of (p. 67 f.). To the present writer there seems to be a real and very important difference. The latter doctrine, at least in the form in which it is generally met with, involves the assumption that each addition to consumption makes a determinate addition to the person's total quantity of satisfaction. But it is a part of that false hedonistic psychology which is now happily on the way to the discard that there is any such thing as a sum total of pleasure. We are learning to formulate our theories of conduct either in frankly behavioristic terms, non-committal as to value relations, or else, if we enter the domain of conscious attitudes at all, to get nearer to the facts of the human value consciousness.

The marginal contribution of a factor of production to the total social product stands on a different footing. The total here (measured in price terms of course) and the increment of product due to the coöperation of a small unit of productive factor are real physical magnitudes and entirely determinate under given conditions, even tho not accurately determinable in reality. Professor Cassel justly ridicules the socialistic version of the theory, which uses it to prove that labor produces all wealth, but his objections to the correct formulation in terms of small increments of the factors are weak. He says (pp. 147, 148) that the method manifestly fails when a factor is not divisible, or when the amount of it in use cannot be changed without simultaneously changing the amounts of the other factors with which it is combined. But when a factor is not divisible, as also when the total supply of a divisible factor is controlled as a unit, its share is the total amount of product dependent upon the use of the entire supply, and that under private property and free contract it can get this remuneration is a plain matter of fact. *If* any indispensable factor *were* indivisible or monopolized, the owner *would* have the world by the throat, and an organization of production and distribution through free bargaining would be impossible.

The second part of the objection also comes down to a question of fact, and the facts are patent to observation. There is practically no limit to the variability in the proportions in which productive agencies of different kinds can be employed *in the system as a whole,* and it is beside the point to observe that the addition of another man may not expedite the digging of a grave. The proportions of the factors are alterable in two ways: first, they are usually very flexible in single industries and establishments, simply by changing the method of production used. There may be discontinuities in the displacement of one factor by another in a single industry, but hardly in society as a whole, or any considerable part of it. And besides, there is practically *no limit* to the variability of proportions in the system as a whole, *even with fixed proportions in every single industry,* through the relative expansion of one industry at the expense of another using the factors in different proportions. With either of these modes of variability operative, competition would work out an apportionment of income on the basis of marginal contributions; and in fact both are operative.

The truth seems to be that Professor Cassel, like many other writers (notably Hobson), has been led by ethical prepossessions to deny a theory of the mechanics of distribution which it is not difficult to show has no ethical implications whatever, tho some of its sponsors (notably J. B. Clark) have thought it had. It is interesting too that the alternative theories proposed are rather readily shown to be reducible to identity with the marginal contribution theory. This is quite true of Professor Cassel, as it was of Wieser, who also threw specific productivity out of the window only to usher it in at the door in a rather thin disguise.

Professor Cassel's own theory of distribution is to be found in his First Book (chapter IV, section 16; The Mechanism of Price Fixation), and this part of his work is far superior to the Second Book, on The Prices of the Productive Factors, to which the foregoing criticism relates. The latter, very ably argued, is indeed rather conventional in its drift and conclusions. About a third of it, the long chapter on interest, is substantially a condensation of the author's earlier book on this subject, referred to above.

This short section of a dozen pages on price theory is the core of the whole book and represents a notable contribution. It is perhaps open to criticism for not going far enough along the line on which the author strikes out. In the first place, the whole of price theory is treated as a unit. It may be necessary for elementary exposition to separate the subject of "value" (the prices of consumption goods) from that of "distribution" (the prices of productive services) and to assume that certain prices are subject to readjustment while others remain stationary, but the result is misleading. Economic theory has suffered too long from the practice of assuming "other things equal" under conditions where they cannot be so, *i. e.*, from assuming factors constant which must be affected by the very change momentarily under discussion. Our author does start provisionally with simplified assumptions, first that the supplies of all commodities are given, as also the demand preferences of individuals and their incomes. Then the demand for any commodity is a function of the prices of all the commodities in the system, not of one alone as generally stated. Thus we have as many equations as there are prices to be determined, with the prices as the only unknowns. Then, introducing continuous production instead of given supplies, it is assumed that known amounts of each productive service are used in producing the different goods, and the prices of the productive services are found in terms of these amounts and of the prices of consumption goods. And so on. The argument is carried forward step by step, showing how with each new variable a new equation is introduced and so the conditions of solution maintained, and that in the system as a whole there are enough relations between the variables to determine them all, in terms of each other.

But some of the author's reasoning is extremely hard to follow, and at one point it appears to break down. When the assumption as to fixed income for each person in the system is dropped and incomes become a new series of variables, an element of indeterminateness appears which the author attempts to circumvent by loading it into the form of the functions and the general theory of money. This is unconvincing, especially since it appears that there are no constants left in the system at all. But there *is* one set of constants in a static economic system, and that is the amounts of each productive factor owned by each person in the system. The overlooking of this element is in harmony with the author's general failure to emphasize the fact of private property as a fundamental feature of the economic order and a prerequisite to freedom of contract, and also with his overemphasis of the similarities between the principles of economics for a socialistic and for a competitive society. (The last might be called a "good fault," since the opposite error is the common one).

A way around the difficulty of indeterminateness is provided by using these absolute numbers which show the amounts of the productive factors in the society and the distribution of their ownership, and by extending Professor Cassel's method and dropping altogether the assumption that any of the variables are provisionally constant. In formulating the demand functions it is in fact necessary to treat each individual in the system separately. Any one individual's demand for any commodity is then a function of the prices of all commodities, and of that individual's money income. If there are N individuals in the system and n commodities, there will obviously be Nn of these "psychological functions." Then if there are ν productive factors in use there will be $n\nu$ "technological functions" each expressing the marginal contribution of some one factor toward the production of some one commodity, as a function of the amounts of all the factors used in making that commodity. These technological functions represent curves of diminishing productivity, as the psychological functions represent curves of diminishing utility if the latter is regarded as having any foundation in reality.

Now reasoning of the conventional sort will establish that under free competition and static conditions the system will tend toward and ultimately will reach an equilibrium in which certain facts obtain, each of which may be stated in a series of equations: (*a*) the (money) income of each individual is equal to his consumption, measured in price terms; (*b*) the amount of each commodity produced is equal to the amount consumed; (*c*) each productive factor is apportioned among the industries producing different commodities in such a way that the specific contributions of all its units are equal in price terms. If these series of equations are written down and the variables tabulated, inspection will show that there are enough relations to determine all the unknowns absolutely, *i. e.*, in terms of the amounts of productive factors owned by all the persons.[3] Moreover, the system can easily be extended to cover progressive, or "dynamic" conditions (which Professor Cassel does not attempt) by simply writing the appropriate magnitudes as functions of time.

The Third and Fourth Books of the treatise must be noticed briefly. The Third deals in an exhaustive and masterly fashion with Money, including bank credit and foreign exchange in their theoretical aspects. The section on Index Numbers is brief but acute. The author holds in the main to the "quantity theory," substantiating his position by a statistical study of world prices and the world supply of gold from 1850 to 1910. For the long swing, he is emphatic: the essential cause of changes in the general price level is the "relative" supply of gold (p. 410). By relative supply he means the ratio between the actual world supply and what the supply at the given date would have been if it had increased at a uniform ratio from 1850 to 1910. This "normal" supply is assumed to correspond to the "demand" for gold, *i. e.*, the amount necessary to maintain a constant price level for the period, arguing from the fact that the price level of 1910 was virtually identical with that of 1850. That is, the "demand for money"

---

[3] If the amount of service rendered by any factor does not bear a constant relation to the amount of the factor but is a function of its price, certain of the functions will be more complicated, but no new unknowns are introduced.

(T/V) is assumed to increase at a constant ratio; or more accurately the demand for gold, tho the relation between the two is not always clear. It is pointed out that the increase in T on the upward swing of a business cycle tends to lower prices, but that this is more than offset by the creation of new circulating medium by banks so that prices actually rise.

We then pass (with the chapter on Foreign Trade as a sort of digression) into the Fourth Book, on The Theory of the Business Cycle, *Konjunkturbewegungen*. This is likely to be the most widely read and discussed division of the work. It is very unfortunate that publication was delayed for some five years after the manuscript was finished. In the meantime students of the subject have become familiar with Professor Wesley C. Mitchell's epoch-making study, equally careful and far more exhaustive and detailed, which our author appears not to have seen. Professor Cassel's treatment is an analysis of what actually happens in the cycle, involving a study of statistics from the whole western world. Little attention is given to explaining the movement in terms of fundamental economic motives.

There is no part of the book but will well repay careful reading. The student will appreciate the excellent printing in Roman type, and must marvel at the clear, readable style, bearing in mind that the author is writing in a foreign language and one in which those born to it do not always succeed in making abstract reasoning easy to follow. The availability of the book for reference would be increased by an index or a more detailed table of contents.

FRANK H. KNIGHT.

STATE UNIVERSITY OF IOWA.

NOTES AND MEMORANDA

PROMOTION FROM WITHOUT

In the history of business enterprise attention has frequently been centered upon the rapidity with which promotion has been won by entrepreneurs. A similar, tho less meteoric, movement brings workers, step by step, to the forefront of their ordinary occupations. I refer not to the familiar customs of promotion, but to a process less known. The artisan has worked out his own scheme of promotion, varying his plan to fit the opportunities, the traditions and the organization of each industry.

Professor Pigou points to what he calls a ladder of promotion, different from that here to be considered — one based on the size of business undertakings. He writes: "When the separate steps in the agricultural or industrial ladder are large, it is difficult for a man adapted, if adequate practice is obtained, for life at one stage, but standing by some accident at another stage, to move to his proper place. Thus to take a hypothetical example: if agriculture or industry were worked exclusively in large units consisting of one or two large entrepreneurs assisted by a number of mere laborers, any capacity for management and direction that might be born among people in the laboring class would have no opportunity for use or development. . . . Thus it would seem that, in the absence of a proper ladder, a great deal of the business capacity born among the working classes must run to waste. If, however, industry or agriculture is organized by way of units of many different sizes, a workman possessing mental power beyond what is normal to his class can, without great difficulty, himself become the entrepreneur of a small establishment, and gradually advance, educating his powers the while, higher up the ladder that is provided for him." [1]

This route of promotion has frequently been commented upon, perhaps because it leads to proprietorship. Nor should such a "training ground of business capacity" be disregarded. For his son, if not for himself, what other goal takes the place of this in the mind of many an American workman? Again and again artisans bewail the difficulty of the entrance of a workman into the merchant class now that our local tea and specialty grocery shops are dominated by chains of stores. These specialty and small local shops furnish in America an entrance into proprietorship in merchandising just as truly as, in Europe, "gardens and small allotments near their cottages for workmen in regular employment elsewhere, large allotments for workmen occasionally taking odd jobs elsewhere, and small holdings for those who devote themselves entirely to work on these holdings, provide in combination a complete ladder from the status of laborer to that of independent farmer." [2]

There is, however, another ladder of promotion which is quite as haphazard, but which stops short of proprietorship, and to this I now turn.

Wherever industries of the same general type are localized there is found a means of promotion based on the quality of product. Plants tend in general to specialize upon certain grades of goods. The plant manufacturing the cheapest grade of goods hires normally the largest number of learners. The learner, when partially trained, moves readily to a higher grade plant. Shifting from plant to plant starts thus as a problem of training. It then becomes a question of promotion among the more experienced workers. Evidence of the relation of labor movement to the grade of product is sufficient to make it appear that what the size of the production unit has been in developing business capacity, the existence of plants of varying grades of the same product has been in developing industrial skill.

1. Pigou, Economics of Welfare, p. 181.
2. Ibid., p. 182.

In every industry there is a tendency for the most alert among the experienced workmen to drift toward plants making the highest quality of goods. In the boot and shoe industry it is the boast of the high-grade shops that they do not train workers; that they can get all the experienced workers they want.[3] Nor is this boast confined to the shoe industry or to American shops. The head of an English firm, of world repute both for labor standards and grade of output, said during a visit to his plant, in answer to a question concerning training, that an industry of their standard should not be expected to train workers.

What is of most interest, then, is the pathway by which these experienced workers journey. Amid all the widespread local and particular business differences can any general trend be found? Seemingly there is some cumulative progress in the drift of the best industrial workers. The railroad repair shops furnish an illustration with historical as well as technical interest. In the eighties and nineties, car repairmen were recruited mainly from the wood-working industries. In periods of depression or in seasons of unusual irregularity, carpenters gladly took the steadier work of repairing. Once in the best organizations, the prestige of being railroad men kept them from shifting. With the gradual use of steel cars, repairmen were recruited more and more from the metal trades. Car repairing then became a step in the ladder for men on structural bridge work. Once in the shop, two possibilities were open. Either one was promoted to be an inspector, starting on the way which led to foremanship; or one was interested in the more technical work which led first to the round house, and later to finer machining work. It is with some apology that old railroad men admit that in the last three years the steps in the ladder of promotion have broken, and repairmen go not to the round house, as in the days of railroad prestige, but to riveting and other shipbuilding operations.

The textile industries furnish a still better illustration.

---

[3] Marshall claims that the shoe industry in America is more specialized than elsewhere. From an organization point of view it is more easy to manufacture one grade of goods, more difficult to manufacture various grades.

Here the technique of the operation is not different on the more fragile and lighter products. Numerous plants often duplicate the same operation. Moreover, establishments usually develop a range permitting many gradations in style and quality of product, in artistic effect, in need for judgment and individuality.

A localized hosiery industry illustrates well the way in which proximity of other industries furnishes a supply of experienced workers. The industry has continued a partial apprenticeship on one operation only. On the other processes the plan of training is so well worked out by the employees themselves that new workers coach each other in which of two or three plants it is best to begin work. The first step will be in a plant doing cotton work on machines of coarse gage. This means rough work, with more or less cotton lint, and above all it means a product of no distinction. The general business situation will, of course, go far in determining how long the worker must stay in a plant; but inevitably a worker with activity of mind will apply at other mills, directly or through friends, until a place is open on a higher grade of work.

Workers, both men and women, discuss this shifting as part of becoming "experienced," not as a problem of wages. The firms with the highest reputation for quality of product have a favorable place in the scale for securing the most alert workmen. Invariably in the hosiery industry a plant doing embroidered silk work will be a plant employing middle-aged and older men. Invariably, too, it will be a plant where supervision is at a minimum, where in normal times no training is given and where labor turnover is not a problem. If the knitters have been trained in America at all, the ladder of experience will have brought them from knitting in a cotton mill of coarse gage to one doing finer and finer work, and ultimately to a plant manufacturing novelty and embroidered silk goods.[4] This illustration is meant to stress the fact that where possible older workers do remain in the same type of industries even tho they may shift from shop to shop. Expertness on a particular operation can often be mastered in a relatively short time. Much more subtle to acquire is the discrimination necessary to handle the materials of the trade. The latter kind of skill is the primary reason for workers remaining with the industry even tho they may move from plant to plant.[5]

---

[4] This subject I hope to treat statistically in a study of the hosiery industry now in preparation.

Among the skilled trades traveling about can somewhat be laid to journeyman tradition following apprenticeship training. When apprenticeship is not provided the more aspiring worker must himself plan his "real" education. Tradition, however, will scarcely account for steps in training among employees in retail stores. Young persons start in five-and-ten cent stores and small local shops, and gravitate to sales positions in department stores. Among the saleswomen and salesmen in these, especially the men, if chance does not open up an executive position for them to continue with the same firm, there is the separate and more specialized shop. Shoe shops, men's furnishing houses, wholesale carpet and rugs give a chance to the shoe, the clothing, or rug department salesman respectively. Incidentally, this means that the low-priced goods are bearing a large item of overhead for the cost of training for the whole industry. Incidentally, also, in so far as the shifting is part of a training problem, its defects cannot be corrected by the individual firm working upon labor shifting for a single shop.

As regards mobility between related businesses, some of the desirable aspects of a labor market of this kind must be admitted and considered. Marshall mentions as one of the factors in Britain's leadership that "the paths of the ocean have been the universities of an exceptional number of her men."[6] Writers have never done justice to the fact that while the factory system forced a worker to specialize, it opened up for him a place in a larger variety of industries. Managers too seldom comment upon the advantage which diffusion of experience brings to their establishment; for, to again quote Marshall, "travellers learn to put on its trial many a habit of thought and action, which otherwise they would have always acquiesced in as though it were a law of nature."[7] During the long period when there were no technical engineers, industry gained by the transfer of knowledge from trade to trade.

---

[5] In going over the experience of men in the paper industry, the writer found a surprisingly large percentage of workmen who had experience in five and six mills. Foremen and minor executives had worked in plants in various geographic areas, yet remained in the paper industry.

[6] Marshall, Industry and Trade, 1919, p. 96.

It is the contention of this article, then, that shifting from plant to plant is not only more deliberate than is usually assumed, but that the margin within which shifting takes place is not found in each industry, but cuts across all industries, giving a chance for continuous progress in skill; and that in the first stages this area is conditioned primarily upon training and somewhat incidentally upon wages. If this is true, what are its industrial implications?

Obviously, it must affect estimates of labor turnover, as well as our comparisons of wages between industries. It is somewhat of a commentary upon our discussion of labor shifting that we hinge upon the facts of an individual plant, completely disregarding the relation to the rest of the industrial organization in the community. Dr. Ruml has already pointed out the correspondence of curves of "leaving" in firms in the same community when comparison is made over a considerable period. All progressive firms are now compiling "causes of leaving" for their own plant. A few also exchange with other plants. These records stop just short of facts which would give the real motive for changing or any hint of the opportunity which the new work is hoped to offer. Most of the reasons are listed on the assumption that there was something in the plant which was unsatisfactory, rather than with the thought that there is something which the best workers wish to attain. No criticism of the plant is necessarily involved. By reason of its type of product it may afford merely a limited trade opportunity on certain processes.

The plant is likely to lay stress upon promotion to supervisory work. The artisan, on the other hand, more usually thinks in terms of steady progress in skill. The machinist thinks less about becoming a superintendent than he does about becoming a tool-maker. His desire for achievement is in terms of trade skill and personal realization of fitness. In modern times, there has always been movement from plant to plant in the same type of industry among employees who felt a desire to "get on" in their trade — a phase of the shifting of workers which has received little attention. No one could claim that all shifting is planned for individual improvement. Need we forget, however, that the same laws are operative in industry that pertain in professional work? Pride of workmanship and quality of product is a motivating force among some industrial workers just as among some inventors, physicians, or teachers. We do not deny interest in his work to the teacher who moves from a small college to one ranking higher in standard, even tho he still prefers to shift, in time, to a great university. May it not be that, for the craftsman, the desire for achievement can be combined with interest in his job?

---

[7] Marshall, Industry and Trade, 1919, p. 143.

The central theme of any serious program of industrial relations must be concerned with promotion. The problem must be met, however, in a larger way than by attempting merely to provide incentives which will keep the worker within a single plant through variety in processes, frequent transfer, or scientific rating of efficiency. Desirable as is any method which gives systematic consideration to all persons in a plant for such promotion as that establishment offers, advancement within it is inevitably based upon someone else's opinion of the employee's aptitude for certain work. Fitness for this work may have been unrealized or the promotion may, in the mind of the employee, have been long overdue. In either case there is lacking the challenge to which the craftsman has always responded.

Comparisons of wages between industries must at best be difficult. "Equal work" is not easily defined. Economists have never claimed that at any one time wages on the same work in different industries would be identical. What they have said is that, on the same grade of work other things equal, wages would in the *long run* tend to be equal. It could easily happen that any producing unit might be securing an unusual group of workmen and pay higher rate of wages for what is equal in name only. Consider, for example, an operation as simple as cone-winding. Some operators prefer to work where no attention is given to the kind of knot tied. On the other hand textile men maintain that certain workers keep applying, until an opening is secured, at a plant known to insist upon one method of tying knots. It may or may not be that a plant with such standards pays a higher wage rate. But there is a difference in stability, care, and skill of workers, and there is an element of promotion and of pride.

The opinion of the writer is that more is necessary in wage comparison than rates, or even average earnings, on identical grades of work. There is needed some study of the actual paths of promotion. Wages on the next grade of product may be preëminently of more practical importance than those on the identical operation. It will not greatly profit an industry to retain the plodding and least ambitious worker, if its policy loses permanently the most alert and technically equipped!

ANNA BEZANSON.

UNIVERSITY OF PENNSYLVANIA

THE NEBRASKA DEPOSIT GUARANTY FUND

Perhaps it is a healthful sign that in states where deposits are guaranteed failures bring criticism of the state departments of banking. Insolvencies cost the sound banks money, for they mean assessments to replenish the guaranty fund. In Nebraska, for instance, where nineteen banks have closed last year and this, there has been effort to throw the blame on the Bureau of Banking. State supervision is always the better for watchfulness and criticism on the part of the banks; but Mr. J. E. Hart, Secretary of the Department of Trade and Commerce and head of the Bureau, says that the statistics of failures and assessments have sometimes been very unfairly used. Correspondence with a number of well informed bankers in Nebraska has, in fact, brought to the writer no evidence of inefficiency in the Bureau.

It is to be remembered, as Mr. J. B. Forgan has said, that examination is always a process after the event. A crook can hide his stealings a long while even from a competent examiner, and sometimes can loot a bank between examinations. In such cases all the supervising authority can do is to close banks as soon as it learns they are insolvent. It appears that in Nebraska this is done, so avoiding the errors of some years ago in Oklahoma, where insolvent banks were allowed to run because there was no money in the guaranty fund and the banking board hoped that the wrecked concerns would get into better condition. They got worse, and eventually cost the fund more than if they had been closed at once. Kansas had a like experience when a former Bank Commissioner delayed closing a bank at Salina, hoping that he could restore it to solvency and thus avoid having to levy upon the guaranty fund. The shrinkage of assets and the loss to the fund continued. Finally, the bank was closed, but the cashier has not been apprehended. Ouster proceedings against the Commissioner were, however, unsuccessful.

The condition of the Nebraska banks as a whole on August 6, 1921, was as follows (000 omitted).

Loans and discounts	$212,643
Overdrafts	1,307
Bonds, securities, etc.	10,001
Banking house, fixtures, etc.	7,148
Other real estate	1,106
Current expenses	6,248
Cash items	159
Due from other banks	37,545
Cash	9,104
	$285,261

Capital stock	$25,871
Surplus	8,157
Undivided profits	7,786
Dividends unpaid	147
Individual deposits	103,467
Certificates of deposit	121,034
Due to banks	6,799
Bills payable	9,904
Depositors' guaranty fund	2,095
	$285,260

The following items are computed from an abstract from the Bureau of Banking covering the affairs of sixteen of the banks closed in 1920 and 1921:

Deposits on dates of closing	$4,055
Drafts on guaranty fund	1,006
Cash in hands of receivers	336
Unpaid claims for deposits	2,669
Assets, good	736
Assets, unclassified	534
Assets, doubtful	910
Assets, worthless	748

Three other failures were so recent that like data were not to be had when these figures were assembled. The deposits of the three in November, 1920, were $1,128,000.

After the figures on which the second table is based were made up, and before September 8 this year, $1,626,000 more was paid out of the guaranty fund on account of banks covered by the table. This makes $2,632,778 paid out of the guaranty fund — say three-fourths of one per cent of deposits—during 1920 and the first eight months of 1921. This is a sum more than there was in the fund at the date of any report in these two years, except the very first report, which showed it to be $2,809,000. The largest single payment was about $700,000, for a bank at Blair; the next in size $300,000, for a bank at Omaha. It is expected that much of this years' payments will be recovered out of the assets of the failed banks.

All these figures have been obtained from the Nebraska Bureau of Banking, through the courtesy of Professor George O. Virtue of the University of Nebraska and of Nebraska bank friends of the writer. In advance of detailed official reports, they are the best yet available. They do not synchronize, but it would appear that the guaranty fund, which on August 6 was $2,095,000, must now have been reduced to $469,000. By the same computation, unpaid claims would amount to $1,043,000 plus the deposits of the last three banks to close, probably less than $1,000,000. Cash in the fund, plus assets classed as good, would not cover the claims.

Considering, however, that the fund can be replenished by emergency assessments equal to one per cent of deposits each year, it will remain solvent. Much wreckage is probably still to be cleared away, and that will be expensive; but the ability to levy two and a quarter millions per annum will, at the worst, take care of all conceivable losses in a very few years.

It will help to tide matters over if Mr. Hart, head of the Bureau of Banking, succeeds in obtaining legislation he is seeking for the postponement of payment of depositors until after the final liquidation of closed banks, giving to depositors in the meantime interest-bearing certificates. Kansas was the first state to adopt this method, and to the writer it has always seemed wise. It leaves at least a little incentive to be careful in picking one's bank; and if the depositors have got only certificates and not cash, the bank wrecker is not made a hero when he comes back to town. The point is not to be overemphasized, of course, for unquestionably the fact that no depositor ultimately loses deadens public opinion. Certain proceedings in the Salina, Kansas, case illustrate this. The chief benefit of the new legislation will be to let assessments catch up to the liabilities of the fund while the receivers are collecting the realizable assets of the closed institutions.

The writer has said before, in these columns,[1] that in every state where deposits are guaranteed the fund accumulated in cash is too small, and that too much dependence is placed in the fact that assessments can be levied to meet failures after they occur. Nebraska's experience seems to sustain this view. The law contemplates the maintenance of the fund at one per cent of deposits. Now, a reserve of $2,000,000 is not sufficient insurance for $200,000,000 of deposits, even if another $2,000,000 can be levied next year. The fund might easily have become insolvent this year. Bank failures have been fewer and smaller than could have been expected with wheat dropping from $3.00 to $1.00, corn from $2.50 to 50 cents, and cattle from $20.00 per cwt. to $8.50. Nebraska should have a cash fund of at least two and one-half per cent, and it would not hurt the Nebraska banks to raise it. They would have to charge it off as an expense, it is true; but under the Nebraska law they would simply set it aside on their books and have the use of it until called for. Thus they would make just as much money on the fund as if it were still their own property.

This is the more necessary because state-administered insurance — that is what deposit guaranty is — cannot, like private underwriting, avoid concentration of risk. Over $10,000,000 of deposits are at the risk of the fund in Omaha alone, and more than twice the fund, as it stood in August, is at risk in a single bank. The bank referred to is one of standing; but such underwriting is unscientific and might — not in this case, but somewhere, sometime — jeopardize the whole fund. The fund, therefore, should be increased.

It must be borne in mind that insurance of deposits is not the cause now leading to bank failures in Nebraska. In the neighboring state of Missouri, where supervision is excellent but deposits are not guaranteed, twenty-two state banks have closed so far in 1921. Fortunately all but one were small, with $50,000 capital or less.

---

[1] See the issue for November, 1913, p. 113.

Several more states have established deposit insurance since the writer last contributed to these pages.[2] Now and then even a national banker expresses favor of the plan. The usual objection, discussed before and still heard, is that deposit guaranty requires the honest and competent bankers to make good to depositors the losses of dishonest and incapable competitors. Like objections are inherent in all insurance, and the reader will favor or oppose deposit insurance according to his estimate of its net social utility. The writer is convinced that still more states will be led by the present bank casualties to adopt the plan.

THORNTON COOKE.

COLUMBIA NATIONAL BANK,
KANSAS CITY, MISSOURI.

---

[2] See this Journal for November, 1909, "Insurance of Bank Deposits in the West"; November, 1913, "Four Years more of Bank Guarantee"; February, 1915, "Deposit Guarantee in Mississippi."

A good survey of the subject at large is in the recently published book of Professor T. B. Robb, The Guaranty of Bank Deposits (1921).

BOOKS RECEIVED

Abbott, William Lewis. Competition and Combination in the Wholesale Grocery Trade in Philadelphia. Menasha, Wis.: George Banta Publishing Co. 1920. pp. 87. (A Thesis, University of Pennsylvania.)

Abel, Mary Hinman. Successful Family Life on the Moderate Income. Philadelphia: Lippincott. 1921. pp. 251. $2.00.

Askwith, Lord. Industrial Problems and Disputes. New York: Harcourt, Brace & Howe. 1921. pp. 494. $5.00.

Baldwin, Donald C. Capital Control in New York. Menasha, Wis.: Collegiate Press. 1920. pp. 255.

Bell, James Christy. Opening a Highway to the Pacific, 1838–46. New York: Longmans, Green & Co., 1921. pp. 209. (Columbia University Studies.)

Bowley, Arthur L. Prices and Wages in the United Kingdom, 1914–20. London: Clarendon Press. 1921. pp. 228. 10*s*. 6*d*. (Carnegie Endowment for International Peace.)

Bowman, Isaiah. The New World Problems in Political Geography. Yonkers: World Book Co. 1921. pp. 632.

Boucke, O. Fred. The Development of Economics, 1750–1900. New York: Macmillan. 1921. pp. 348.

Carnegie Endowment for International Peace. The Proceedings of the Hague Peace Conference. Translation of Official Texts. New York: Oxford University Press. 1921. pp. 1086. (Conference of 1907. Vol. II.)

Clapham, J. H. The Economic Development of France and Germany, 1815–1914. Cambridge, England: University Press. 1921. pp. 420.

Cole, William Morse. The Fundamentals of Accounting. Boston: Houghton Mifflin Co. 1920. pp. 434. $3.50.

Douglas, Paul H. American Apprenticeship and Industrial Education. New York: Longmans, Green & Co. 1921. pp. 348. (Columbia University Studies.)

Einstein, Lewis. Tudor Ideals. New York: Harcourt, Brace & Howe. 1921. pp. 366.

Hecht, John S. The Real Wealth of Nations. Yonkers, N. Y.: World Book Co. 1921. pp. 350. $2.40.

Hobhouse, L. T. The Rational Good. New York: Holt & Co., 1921. pp. 237.

Hunter, Merlin Harold. Outlines of Public Finance. New York: Harper & Bros. 1921. pp. 533.

Jones, Robert. Taxation: Yesterday and Tomorrow. London: King & Son. 1921. pp. 147. 3*s*. 6*d*.

Knight, Charles Kelley. The History of Life Insurance in the United States to 1870. Philadelphia: 1920. pp. 160. (A Thesis, University of Pennsylvania.)

Kuno, Yoshi S. What Japan Wants. New York: Thomas Y. Crowell Co. 1921. pp. 154. $1.00 net.

Lambert, Edouard. Le Gouvernement des Juges et la Lutte contre la Législation Sociale aux États-Unis. Paris: Marcel Giard & Cie. 1921. pp. 276.

Le Bon, Gustave. The World in Revolt. New York: Macmillan. 1921. pp. 256. $4.00. (Translated by Bernard Miall.)

Le Rossignol, James Edward. What is Socialism? New York: Thomas Y. Crowell Co. 1921. pp. 267. $2.00.

Lincoln, Edmond Earle. Problems in Business Finance. New York: Shaw Co. 1921. pp. 525.

MacMurray, John V. A. Treaties and Agreements With and Concerning China, 1894–1919 (two volumes). New York: Oxford University Press. 1921. pp. 1729. (Carnegie Endowment for International Peace.)

Mawas, Alfred. Le Système Monétaire et le Change Anglais depuis la Guerre. Paris: Marcel Giard & Cie. 1921. pp. 404.

Mitchell, Broadus. The Rise of Cotton Mills in the South. Baltimore: Johns Hopkins Press. 1921. pp. 281. (Johns Hopkins University Studies.)

Mousley, Edward O. An Empire View of the Empire Tangle (Imperial Conference, 1921). London: King & Son. 1921. pp. 87. 3s.

Nicholson, J. Shield. The Revival of Marxism. New York: E. P. Dutton & Co. 1921. pp. 145. $2.25.

Paxson, Frederic L. Recent History of the United States. Boston: Houghton Mifflin Co. 1921. pp. 603. $3.75.

Powell, Fred Wilbur. The Railroads of Mexico. Boston: Stratford Co. 1921. pp. 226. $2.00.

Raymond, Dora Neill. British Policy and Opinion during the Franco-Prussian War. New York: Longmans, Green & Co. 1921. pp. 435. (Columbia University Studies.)

Robb, Thomas Bruce. The Guaranty of Bank Deposits. Boston: Houghton Mifflin Co. 1921. pp. 225. $2.50. (Hart, Schaffner & Marx Essays.)

Ross, Victor. The History of the Canadian Bank of Commerce. Vol. I. Toronto: Oxford University Press. 1920. pp. 516.

Salter, J. A. Allied Shipping Control. Oxford: Clarendon Press. 1921. pp. 372. 10*s*. 6*d*. (Carnegie Endowment for International Peace.)

Schevill, Ferdinand. Political History of Modern Europe. New York: Harcourt, Brace & Howe. 1921. pp. 663. $2.50. (New edition.)

Sharfman, I. Leo. The American Railroad Problem. New York: Century Co. 1921. pp. 474. $3.00.

Stamp, Sir Josiah. The Fundamental Principles of Taxation. London: Macmillan & Co. 1921. pp. 201. 10/6 net.

Stoddard, Lothrop. The New World of Islam. New York: Scribner's. 1921. pp. 362. $3.00.

Taussig, F. W. (Editor.) Selected Readings in International Trade and Tariff Problems. Boston: Ginn & Co. 1921. pp. 566.

Wilcox, Delos F. Analysis of the Electric Railway Problem. New York: D. F. Wilcox. 1921. pp. 789. (Prepared for the Federal Electric Railways Commission.)

Wright, James M. The Free Negro in Maryland, 1634–1860. New York: Longmans, Green & Co. 1921. pp. 362. (Columbia University Studies.)

Young, George. Diplomacy Old and New. New York: Harcourt, Brace & Howe. 1921. pp. 105. $1.00. (International Relations Series.)

THE
QUARTERLY JOURNAL
OF
ECONOMICS

FEBRUARY, 1922

AGRICULTURE IN EASTERN EUROPE

SUMMARY

I. Overcrowding of the land, 170. — Importance of agricultural problem of eastern Europe. Density of population. Large proportion of rural population; its high density. Low yields. Per capita grain production. II. Consequences as to standard of living and food supply, 174. — Predominantly vegetable diet. Small surplus after supplying wants of producer. Live stock. Prewar grain exports. Reduction of food output during war; continuation of similar causes after war. Widespread food shortage. The Russian famine. III. Prospects for recovery, 180. — Conditions favoring recovery. Importance of political conditions. Increased crops of 1921 except in Russia; exports of food; effect on currency exchange. Probably slower recovery of Russia. IV. Prospect for progress in peasant agriculture, 183. — Vicious circle of overcrowding, poverty, ignorance. Effects of overcrowding on agricultural methods. Shallow plowing. Unsatisfactory crop rotation. Scattered holdings — their explanation and consequences. Mir system. Beneficial effects of democracy. Rapid progress improbable. V. The large estates, 190. — Large-scale operation. Superior efficiency. Polish estates. Agrarian reform — division of estates. Direct gain to peasant overestimated. Measures already taken. Ultimate effects, especially on peasant psychology.

THE great food relief operations conducted by the United States government and later by the private agency of the American Relief Administration and other less important organizations have directed attention more than ever before to the agricultural problems of eastern Europe. Just as the food problem of the

Allies during the war drew public thought to the overwhelming importance of world agriculture, so the food shortages of eastern Europe during and since the war have awakened new interest in the present agricultural conditions of that region and in its future position in relation to world food supply.

I

Unless one examines carefully normal conditions as they showed themselves before the war, it is impossible to understand how a primarily agricultural region like eastern Europe could have found itself in a position of widespread famine. It had been customary, on the part of many people, to think of eastern Europe as possessing a great surplus of agricultural products for export. Some conceived of it even as a region of sparse population comparable to Canada or the Argentine. It was familiarly known that the masses of the population were poor, but the degree of their poverty was not fully grasped and it was attributed chiefly to their ignorance and to misgovernment.

The truth is that most of eastern Europe is very densely populated, that its prewar export of food products represented a very small proportion of its production, and that the poverty of the people was due more to overpopulation than to any other one cause, if not more than to all the other causes combined. While the conditions may have been fairly well understood by economists, it is worth while to repeat, for the sake of emphasis, certain facts which may be familiar to them, as well as to consider the bearing of these facts upon the present situation in eastern Europe and upon the probable future.

Prewar agricultural conditions, of course, varied considerably in different parts of eastern Europe. What is said in this article applies most fully to European Russia and Poland (except Prussian Poland, where conditions were very different). It applies in a somewhat less measure to Roumania, Bulgaria, and Jugo-Slavia, and in a still less measure to Czecho-Slovakia and Hungary. Of the most typical regions it may be said that the great bulk of the population is engaged in agriculture, that the population is so dense that the agricultural worker has only a very limited amount of land to work on and that the great bulk of the food which he produces has to be consumed by himself, his family, and his domestic animals, leaving comparatively little for exchange for other products and services.

The greatest density of population is found in Poland. According to the latest prewar estimates for Russian Poland (the so-called Congress Poland) its density of population was about eight times that of the United States. There were about 270 inhabitants per square mile, as against 35 in our own country in 1920. Even such a rich agricultural state as Iowa has only 43 inhabitants per square mile. The density of population of Galicia was the same as that of Congress Poland. In European Russia, as a whole (excluding here, as in later figures, the present Poland, the Baltic states, Bessarabia, and Transcaucasus) there were 67 people per square mile. This figure, however, gives an inadequate idea of the density of population of those parts of Russia which are adapted to agriculture. Over vast northern stretches the cultivation of the soil is impossible. If two governments only, Archangel and Vologda, be excluded, the prewar population density rises to 90 per square mile, and in many governments of the Black Soil region of southern Russia the figure was from 120 to 180. Owing to the war, famine and revolution, the population of both Poland and Russia has declined but it is still extremely dense.

These contrasts between eastern Europe and the United States by no means fully bring out the great difference with respect to the average quantity of land at the disposal of the agricultural worker. A far larger proportion of the population of that region is engaged in agriculture than is the case in our own country. Statistics as to occupations or as to urban and rural population are not strictly comparable. In 1920, 49 per cent of the population of the United States was classed as rural, that is as living outside of cities and towns of 2000 or more inhabitants. In Congress Poland just before the war the proportion classed as rural, that is, as living outside the cities and market towns, was 68 per cent; in Galicia it was 80 per cent and in European Russia it was 86 per cent. The number of rural inhabitants per square mile in the United States as a whole in 1920 was 17.3; in Iowa, a typical agricultural state, 27.4. In Congress Poland, the number was as high as 183, in Galicia 213; in European Russia it was 58, but in many sections of the country the rural density was from 100 to 150 per square mile.

There is, of course, a causal connection between the density of population in eastern Europe and the high proportion engaged in agriculture. The situation is quite different from that in countries like England, Germany, and Belgium. Density of population is there accompanied by a small proportion of agricultural inhabitants. The industrial class subsists by the import of great quantities of food which are paid for by the products of manufacturing and mining. But in a country not sufficiently industrialized to be able to pay thus for imported food, if the density of population is very high, a large proportion of the people must work upon the soil in order to gain enough food for life. The rural population in eastern Europe is incapable of feeding a large urban population in addition to feeding itself. The great bulk of what the farmers produce they must consume themselves.

Not only, however, does the agricultural worker of eastern Europe have far less land at his disposal than his fellow in more happily situated countries, but from what he has he extracts comparatively little per unit of area. Even before the war crop yields in this region were low. In Russia they fell below those even of a country with comparatively extensive cultivation like the United States, and were scarcely a third as high as yields in countries like England, Denmark or Germany, where intensive and scientific methods are applied. Taking all bread grains together — more precisely all grains except oats — the United States in 1919 harvested 1140 pounds per acre planted to these grains. The corresponding average for European Russia before the war (1911–15) was 660 pounds.

As a consequence of overpopulation and underproduction, the agricultural output per head of the total population of eastern Europe is extremely low as compared with that in the United States, and the production per capita of the rural population relatively far lower still. In our own country in 1919 the production of all grains except oats was equivalent to 1889 pounds per capita of the total population. For European Russia the corresponding figure before the war averaged 804 pounds or much less than half as much. If the calculation be based upon the rural population only, we have for the United States 3885 pounds per capita and for European Russia only 937 pounds, or less than one-fourth as much. If one should take into consideration all other products of the soil, the comparative picture presented would not be materially different. Without entering into statistical details it may be said broadly that in Congress Poland

and in Galicia the prewar conditions as regards output of crops were not greatly different from those in Russia. Yields per acre were higher but the average output per head of the rural population was as low or lower, and in Congress Poland the output per head of the total population was lower than in Russia. In old Roumania, Bulgaria, and old Serbia yields per acre were also very low.

II

Leaving for the moment the discussion of the causes of the inefficiency of agriculture in eastern Europe, let us consider some of the results of the low per capita production as regards normal methods of living and also its relation to the food shortage of the war and the postwar period.

It requires no argument to show that the rural population of eastern Europe, producing in general only from one-third to one-fifth as much per capita as the rural population of the United States, must content itself with a far lower standard of living. In the first place the eastern European peasant must put up with a simple and cheap diet, chiefly composed of vegetable foods. He cannot afford to convert much of his grain into meat and other animal food products, for the food value thus obtained is much less than that of grain itself. The calory value of grain consumed as bread is five or six times as great as that of meat obtained by feeding the same quantity of grain to a beef steer. In the second place, the peasant cannot spare much, either of the grain as such or of the animal products derived from it, to exchange for other commodities which will go to promote his well-being, to say nothing of his comfort or luxury.

It is impossible to overemphasize the enormous contrast between the standard of living of eastern Europe and that of the United States. It was borne in upon the writer in a striking manner last summer when on returning from Poland he spent some time in one of the rich rural regions of the United States. It is true that the contrast is greater now, when Poland, like the rest of eastern Europe, is suffering from the aftermath of war, than it would have been some years ago. But even under normal conditions it is far greater than the mass of American people imagine. Statistics are not available, but there is reason to believe that the average Middle Western farmer, after supplying the food requirements of himself and his family, has left for sale to satisfy other wants — housing, clothing, fuel, furniture, education, amusement and what not — not less than five times, probably more than ten times and possibly even twenty times as much product as remains to the eastern European peasant after he has satisfied his much simpler food requirements. In the better agricultural regions of our country almost every farmer has an automobile costing from five hundred to two thousand dollars and requiring some hundreds of dollars yearly to maintain. There is hardly one peasant (that is, one ordinary farmer as distinguished from the great land owners) in all eastern Europe who owns even the most rudimentary "flivver." This, however, is an inadequate illustration. If among the things that the average American farmer enjoys, it were automobiles alone that the Russian or Polish peasant had to get along without, he would consider himself happy enough.

The small consumption of meat and other animal products in eastern Europe greatly affects the whole character of agriculture. Live stock raising is far less important than in the United States. Domestic animals serve for draft purposes more than for food. In the United States in 1919 there were 63 cattle for each hundred of human population. In Russia in Europe (within its present boundaries) there were, before the war, 23. Far more striking is the contrast with regard to hogs. In this country there were 56 per 100 inhabitants; in Russia before the war there were 9. The present figures for Russia would be far lower than these. As is well known, the great bulk of the corn raised in this country — and it is our principal grain — is fed to animals. In Russia very little grain of any sort is fed to food animals and comparatively little even to working animals; they have to subsist chiefly on hay and root forage. The comparative unimportance of live stock, with its consequent lack of fertilizing manure, is one of the explanations of the low yields of crops. For the same reason the eastern European peasant is forced to idle most of the winter, his productive effort being virtually confined to the crop season.

The fact that eastern Europe before the war was a great exporter of grain must not be misunderstood. It exported from its poverty, not from its wealth of agricultural production. In part, the exportation was attributable to the fact that a considerable fraction of the agricultural output went to the state or to landlords in the form of taxes, rents, or profits of large estates. A small number of wealthy people were able to import luxuries, largely by export of the products wrung from the sweat of the peasants. Of course the peasants themselves had to buy some things — machinery and tools, a little petroleum, a little cloth, and some household utensils — and part of these had to come from abroad and to be paid for by the exportation of grain.

In any case, the prewar exportation of grain from most parts of eastern Europe was a small proportion of the total production. False ideas as to Russia's grain export are sometimes drawn from the comparison of quantities of wheat shipped abroad with the quantity produced in the country. Most of the Russian peasants cannot afford to eat wheat. Their principal bread grain is rye. Of the combined production of wheat and rye in Russia before the war only one-eighth was exported, and the fact that the quantity so exported was equal to or greater than the wheat exports of the United States was attributable merely to the vast area and population of Russia. It should be remembered that while grain constituted the bulk of agricultural exports from Russia, our own country, besides grain, exports meats and fats, representing indirectly a great quantity of grain, and that we export also much cotton. Poland had before the war hardly any net exportation of grain at all. Roumania and Bulgaria, less densely populated, exported a much larger proportion of their crop than Russia, but even in these two countries the greater part of the product of agriculture was consumed by the farming population itself. It should be remembered, too, that the farms of the United States, besides what they export, not only feed their owners and workers with a much more expensive diet than that of the eastern European peasant, but also provide with an expensive diet the large urban population of our country.

It can readily be realized that with the normal situation of agriculture and of food supply such as has been described, war and revolution struck a mighty blow to the well-being of eastern Europe. That region could ill afford any great reduction of its agricultural output. A tremendous reduction was forced upon it by the war and its aftermath. Food shortage amounting to famine was the inevitable result.

The great war affected the agricultural production of eastern Europe in several ways. Military operations directly precluded the cultivation of the soil over considerable areas. Peasants were driven from their homes; their houses and other buildings were destroyed; their animals carried away; their fields laid waste. This was particularly true of a strip some hundreds of miles long and from twenty to fifty miles wide running through what was western Russia and through eastern Galicia, where the Germans and Russians faced one another for many months. The Russians in retreating to this line of defense laid waste the land, in order that their enemies might not have supplies. Roumania and Serbia likewise suffered greatly from direct military operations.

Vast numbers of horses were taken from the farms for military use. For farm machinery eastern Europe was largely dependent on western Europe and America; shut off from these sources of supply, it witnessed a gradual wearing out of the more elaborate machinery, and even a large proportion of such fundamentally necessary implements as plows and harrows became unserviceable. In certain sections, notably in western Poland and in the Ukraine, many of the farmers, especially the owners of large estates, had been accustomed to use quantities of artificial fertilizer, mostly imported; the deprivation of this was alone responsible for a marked decline in output. In the province of Posen, which was one of the best cultivated districts of all Europe, the average yield of rye, the chief crop, which before the war had been between thirty and thirty-five bushels per acre, fell by 1919 to only a little over twenty bushels.[1]

The war also had a disastrous effect on the psychology of the farming population. Hostile governments and armies often requisitioned supplies from the farmer, paying him far less than their value or nothing at all. Governments, whether hostile or otherwise, thought it necessary, as a protection to the urban population, to impose all sorts of restrictions on prices of and trade in agricultural products. Doubtless these measures of control were to some extent justified, but they tended greatly to discourage production.

---

[1] The yield was still less in 1920, but this was due to unfavorable weather.

In most of the countries of eastern Europe some at least of these conditions adverse to agriculture did not cease with the war. For two years after the conclusion of the armistice between the Allies and the Central Powers, Poland was at war with the Bolsheviks; in 1920 invasion swept over a third of her lands at the very harvest season. Russia is still in the throes of revolution and misrule. Throughout eastern Europe lack of ability to pay, accentuated by the tremendous fall of exchange due to other causes as well as to lack of exports, continued to check the importation of machinery and fertilizers. Government control of food prices has been maintained in most of the countries almost, if not quite, to the present day — in some cases after the justification for it had wholly ceased.

Food shortage was the natural result of these war and postwar conditions. To some extent throughout the war, to a large extent during its last year or two and for a year or two after its close, suffering for lack of food reigned in all of eastern Europe. In Russia conditions have grown worse with each succeeding year, culminating now in a terrific famine.

The food shortage has been felt, of course, most severely by the industrial population. The peasant looks first after his own food requirements. Besides, he often had little motive to sell any surplus he might possess, because there was little he could buy with the proceeds. The production of mining and manufacturing industry had been even more disturbed by the war than that of agriculture, and the cities had almost nothing to give in exchange for the farmer's products. It came to such a pass that often the peasant gave up food to the urban population only under government compulsion — in Russia especially backed by the bayonet. In most regions the peasants themselves have had enough to eat. In certain sections, however, which suffered most from direct military action — eastern Poland, for instance — even they have been hard pressed by famine. In Russia, where Nature contributed to the disaster, millions of peasants are threatened with starvation this winter.

There is no need here to enter into detail regarding the causes of the Russian famine. The Soviet authorities themselves admit that their former policy of requisitioning from the peasants their entire surplus, of suppressing entirely free trade in food, was a great blunder. They have substituted a tax in kind, after paying which the producer is free to sell his grain. Other causes have contributed to the great reduction in the area planted in Russia and to the lowering of the standard of cultivation, but the lack of motive to produce was the most important factor. The great drought in the Volga Basin — by no means the whole country being affected — put the climax on a situation which was already bad.

III

In considering the prospects of agriculture in eastern Europe, one must distinguish the near from the distant future, and distinguish the prospects for a mere recovery of prewar standards of production and of living from those for an advance beyond those standards.

Fortunately agriculture is one of the hardest industries to kill. It is less dependent on external circumstances than manufacturing or mining industry. Moreover the somewhat primitive agriculture of eastern

Europe would, under favoring conditions, stand a better chance of regaining its former level than would a highly advanced agriculture which had suffered a similar blow. Having always been on a low plane it had not far to fall, and has not far to rise again. Above all it was and is less dependent on world market conditions than an agricultural industry which sells most of its products either abroad or to an industrial population at home. The peasant having always produced chiefly for his own consumption has a powerful incentive to bring his output up at least to the point where it will supply that fundamental need. He has not so much land but what he can till it all after some fashion even with a much reduced equipment. Most peasants never used artificial fertilizer.

The big estates of eastern Europe, which, as more fully shown later, were before the war considerably more efficient than the peasant farms, have suffered relatively worse than the latter from the war and its sequences. They are likely, so far as they continue to exist at all, to recover their normal status somewhat more slowly.

The prospects for the restoration of agriculture in eastern Europe to its prewar efficiency depend largely on political conditions. These, of course, can scarcely be forecasted, especially in Russia. Wherever it has had a fair chance, agriculture in eastern Europe has already shown a marked tendency toward recovery. Except in Russia the improvement in 1921 was especially conspicuous. In 1919 Poland, Roumania, and Jugo-Slavia all received food aid in large amounts from the United States. From the crop of 1921 all these countries will be able to export. It should be understood, however, that a country which has long been deprived of much needed foreign goods will export food even at the expense of a less abundant and varied supply at home than would otherwise be considered necessary.

Data are lacking for a general comparison of statistics of recent crops with prewar crops in eastern Europe. The best statistics are those of Poland. The government authorities estimate that the 1921 output of rye, the principal grain, while double that of 1920, was only 72 per cent of that of the last year preceding the war. The deficiency is greatest in the regions which before the war had the highest yields.

Taking it altogether, the prospects for the restoration, in eastern Europe apart from Russia, of something approaching the prewar efficiency of agriculture seem fairly encouraging. The bearings of the improvement which has already been achieved upon the general economic and financial situation of this region merit more discussion than the space of this article will permit. Broadly speaking it would appear that the eastern European countries — always excepting Russia — are already in a position such that they could, if they would apply taxation vigorously, stop that printing of paper money which is at present the chief cause of decline in their exchange. Government expenditures, relatively to the income of the people, have been reduced materially, and the great excess of imports over exports, which tended to cause a fall in exchange greater than that in the internal buying power of money, has also been much lessened. To balance the budget of these countries, however, necessarily means heavy taxation of the peasant class, which, altho poor, receives a large proportion of the total national income — a much larger proportion than before the war. The peasant class is pretty much in the saddle politically, and it has not yet come fully to realize the necessity of shouldering the burdens of government expenditure, altho it is showing a growing appreciation of that necessity.

As to Russia, prophecy is much more difficult still than as regards the rest of eastern Europe. Everything depends on the political conditions. Even, however, if a stable and just government is soon established, it will take long for Russian agriculture to recover fully. Its ruin has been more complete than anywhere else. The loss of machinery, tools, and draft animals has been enormous. It will take years to restore the confidence of the peasant in the advantage of producing a surplus beyond his own needs. And even when such a surplus is forthcoming, its exportation in any large quantities will have to wait the rehabilitation of the Russian railroads and of the coal mines on which the operation of the railroads hangs. No doubt, however, as elsewhere, the long deprivation of supplies from abroad will create strong pressure for export even from a production much lower than that before the war. On the whole it seems little likely that Russia can regain its former place in the world's grain trade for a good many years to come.

IV

Looking forward to the more distant future, density of population stands forth as the principal factor tending to check the progress of agriculture in eastern Europe, and quite capable, perhaps, of damning it to decades if not centuries of inefficiency.

A dense agricultural population is not necessarily poor, altho it can never hope to be as prosperous as a sparser agricultural population of equal intelligence and skill. A large amount of labor applied to the soil will, of course, with equal intelligence, produce more per acre than a small amount, but it will not produce so much per man. Unfortunately where a large amount of labor is applied with a small degree of skill, as in eastern Europe, even the output per acre may become low, while that per man sinks to a pitifully small quantity. The worst thing is that, where this condition has once come about, it is very hard to cure. A vicious circle becomes established. Because population is dense it is poor. Because it is poor it cannot afford education. Because it is uneducated it makes poor use of its resources. Not only that, but lack of education leads to unwise and unnecessary multiplication of numbers, and the chain begins all over again.

It must not be hastily assumed that there is some inherent inferiority of race which accounts for the low standard of civilization and efficiency in eastern Europe. Such inferiority may exist, but it is difficult to prove its existence and it certainly is much less marked than many people suppose. Density of population, poverty, and ignorance have come about mainly, one may believe, through a train of historical circumstances whose causes are so difficult to trace that one is almost justified in calling them historical accidents.

When one comes to examine in detail the agricultural methods of eastern Europe, he finds that their inefficiency is largely explained either by the small size of holdings resulting from density of population or by practices as regards land tenure which are relics of the days of feudalism and serfdom, until so recently reigning in that region. Ignorance of course contributes largely to the inefficiency, but it is by no means the only cause.

The two most striking defects in the peasant agriculture of eastern Europe are the inadequate plowing and the unsatisfactory rotation of crops. Both defects, while more serious as the result of the war and the subsequent events, have always been grave. In many cases the fields are little more than scratched by the plow. Especially where the soil is heavy, the furrow is often not more than four inches deep and seldom more than six. Even in a country with as light a soil as Poland, plowing is far shallower than is customary in the better farming regions of the United States. Often the fields are very well dragged and even rolled after plowing; but this does not make up for the lack of depth, which not only prevents the adequate amount of food from reaching the roots but also prevents the proper conservation of moisture.

The shallow plowing is due in part to the character of plows used and in part to the lack of power to propel them. Plows are often mere sticks of wood with a small tip of iron. Tractors are of course practically unknown to the peasant farmer. To be sure, in prewar times, there were enough horses in most parts of eastern Europe to do plowing well, had their labor been fully utilized. The difficulty as to horse power arose from the small size of the holdings. The average peasant could not afford more than two horses—often very small beasts, at that — and many could afford only one. If the peasant who had two horses had three times as much land and four horses he could plow it all deeply enough. Obviously better results could be obtained by coöperation among neighbors in the use of draft animals, and to some extent this was practiced even before the war. It has been practiced still more of late on account of the reduction in the number of draft animals as the result of the war. But at present there is a real shortage of such animals in most sections, so that even with coöperative plowing the peasants can scarcely till as much land as before the war with equal thoroughness.

No doubt the peasant's ignorance of the importance of deep plowing has had something to do with his practice, but broadly speaking his small holdings and his poverty have been a more important cause.

Peasant farming in eastern Europe is generally characterized by a very small number of crops. In most regions the peasant ordinarily sows, in the fall, rye and rye only, altho in some sections wheat replaces rye or both may be sown. In the spring, he sows chiefly oats or barley or both, except in certain regions, especially in the south of Russia, where large amounts of spring wheat are sown. He has a considerable acreage of potatoes in many cases. On the other hand, peasants seldom raise other root crops in important quantities, nor do they raise much clover, alfalfa or other nitrogen-fixing plants.

Closely akin to the unsatisfactory rotation of crops is the wasteful practice, widely spread over eastern Europe, of leaving a large fraction of the land fallow each year. The normal thing is to plant fall grain on a given piece of land one year, to plant spring grain and potatoes the second year, and to leave it idle for recuperation the third year. To be sure, in some regions the peasants have pretty much got away from this rudimentary "three-field" practice. The inefficiency of the crop-rotation and field system in eastern Europe is partly due to ignorance, no doubt, but it is partly due, like the shallow plowing, to the very small size of the fields. Comparatively small fields are of course an inevitable result of small land holdings. The evil of small fields, however, is in many places greatly aggravated by the practice of splitting up the holdings into numerous scattered parcels. A peasant who owns ten acres is likely to have it in ten or a dozen pieces, perhaps situated several miles from one another. The eastern Europeans call this "checker board" agriculture, altho the adjective is hardly happy since these parcels are usually in the form of long strips sometimes only a few feet wide, so narrow as to seem to an American almost microscopic.

The explanation of the existence of this checkerboard system is complex. It is, of course, possible for lands to become very much broken up merely as the result of the dividing of a parent's holdings among his children and the subsequent shifting of titles by marriage. In a country like the United States, inheritance and marriage tend but little to result in scattered holdings because purchase and sale and exchange of land are easily effected from the legal standpoint and are a part of the common tradition of the farming community. But in many of the countries of eastern Europe, transfer bristles with legal difficulties. Moreover the peasant has not yet acquired confidence in titles and feels more secure of that which he has received through his parents or through his wife than of that which he buys or gets by trading.

In much of eastern Europe, however, the parcelation and scattering of holdings has gone much farther than would have resulted from inheritance and marriage alone. It has been augmented by peculiar practices of the past. Formerly peasant villages often held — or perhaps, rather, cultivated, since the title was usually in the crown or in the noble — their lands in common. In that case the village land was generally cultivated on a three-field system, such as has already been described. In the course of time common cultivation ceased and the individual peasant was allotted land, either permanently or for a term of years. Instead, however, of receiving the land all in one piece he received a strip in each of the three fields. These three strips were then further subdivided through inheritance and shifted by marriage.

This situation with respect to land tenure has much to do with the choice of crops. The peasant holding several small strips has far less freedom than he would have if his land were all in one place. He must in general sow what his fellows sow. If he did not he would have to tread down their crops in order to get to his fields. It would be quite impossible to have a road leading to each of these microscopic strips; that would waste too much land. Besides, where strips are very small, self-seeding from neighboring fields is difficult to prevent.

In many parts of Poland and of Russia this situation results in a virtual continuation of the days of community operation. Often one sees what looks like a single huge field such as those of the big estates, but which actually consists of many separate strips under the same crop. Each peasant plows, harrows, seeds, and harvests his own strip, but he does each class of work at the same time as his fellow peasants. It is obviously more difficult for a whole community to make up its mind to adopt some new system of crop rotation than for the individual to do so.

Another related cause of inefficiency of agricultural production appears in many parts of Russia. This is the Mir system of tenure. Under it the peasant does not have permanent ownership of the land he tills. The residuary title is in the village — the peasant group. From time to time the lands are redistributed. Between such redistributions the peasant has nominally complete control of his land, altho in practice, as has already been suggested, he is greatly limited in choice of crops. Under the system of periodical redistribution the peasant lacks adequate incentive for careful cultivation and especially for the use of artificial fertilizers or for drainage or other permanent improvements.

The persistence of such excessive parcelation of land and of the practice of periodic redistribution is partly a result of ignorance. The peasant does not realize how much he is losing in efficiency. He does not grasp the possibility of different methods. At the same time it should not be forgotten that in the Old World habit and tradition are more deeply ingrained than in a country like our own. It is not easy even for well-educated people to break away from the traditions of centuries and the customs of their neighbors.

The greatest hope for ultimate betterment of peasant agriculture in eastern Europe lies in democracy. Crude as may be the democracy thus far established, or that likely to be achieved for a long time to come, it cannot be so deadening as the despotism which, in Russia especially, formerly existed. The eastern European peasant was formerly a cipher politically. In every country of eastern Europe, except Russia, he is now a full-fledged citizen, whose vote counts equally with that of the land baron. Even in Russia, where one dictatorship has given place to another, it may readily be that the revolution has prepared the ground for a real rule of the people.

The establishment of democracy will enable the masses of eastern Europe to correct age-long abuses, which have not merely wronged them but have hampered their efficiency. It is likely to have a wholly beneficial effect upon their psychology. The consciousness of possessing rights and power is a stimulus to effort and to self-improvement. One of the most striking features in the life of Poland is the eagerness of the peasants for the educational facilities so long denied them. This consciousness makes also for independence of judgment, for the critical examination of traditional methods, for readiness to try experiments.

None the less, however hopeful one may be as to the success of democracy in eastern Europe, there can be no rapid overcoming of the inefficiency of agriculture. Poverty will still remain because overcrowding will still remain, and poverty will long prevent the masses from securing any high degree of education even in practical agricultural lines. It is even possible that, unless the people learn to restrict the multiplication of their numbers, they will find it impossible to raise their standard of living. Increase of acre yields may bring no increase of yields per man.

V

The discussion, thus far, has dealt chiefly with the peasant. How about the large owner? Will he make progress beyond the prewar efficiency? The question is rather whether he will persist at all and what will be the effect on production if he loses his holdings.

Broadly speaking, the large land owners of eastern Europe have cultivated their lands better than the peasants. Their efficiency, however, has varied enormously, from country to country, section to section, and farm to farm.

Most of the big estates of eastern Europe have been operated and are now operated — where they still exist — by large-scale methods. Comparatively seldom does the owner lease out his holdings to peasants to operate on a small scale. The whole estate may be operated as one farm or, if very large, it may be divided into several or many farms — each however of considerable size, say a thousand acres or so — which are operated either under lease or by hired managers. The typical farm of this type has extensive buildings, numerous draft animals and a large corps of hired workers. Many of the laborers are permanently attached to the estate; others, especially at harvest time, are temporarily employed. Often part of the labor is done by land-owning peasants who own holdings so small that a considerable amount of their time can be hired out.

Even where the big land owner is not an expert farmer he is likely to cultivate his land somewhat better than the peasant. He can afford better machinery and enough draft animals for deeper plowing. He is not hampered by small fields or by the necessity of consulting his neighbors as to what he shall plant. In many parts of Russia, before the war, the owners of the big estates gave but little attention to them. They spent their time in Moscow or Petrograd. They had so much land that they could live extravagantly without good management. Even so, prewar statistics show yields per acre for the large estates greater, in every section of Russia, than those of peasant farms, the difference in most cases being from 10 to 20 per cent. The average output per man employed on the large estates exceeded that on peasant farms by a still greater margin. The estate owner maintains only enough labor to handle the land. A good deal of the time of the peasant is wasted because he has not land, machinery, or animals to balance properly his own labor.

Far greater, however, was the superiority of large-scale farming in the cases where the owner put real energy and intelligence into the operation. Especially among the Poles a very considerable proportion of the big proprietors were good farmers, who gave personal attention to their estates, living on them all the year or at least during the crop season. Many of them studied advanced agricultural methods in schools of their own country or of Germany and western Europe. They not only used good machinery, equipment and live stock, but were often highly expert in the rotation of crops, selection of seed, drainage and use of fertilizers. The greatest degree of efficiency was attained in Posen and West Prussia — those parts of Germany which have now gone to Poland. Here, of course, German influence entered. Poles, however, owned more of the big properties than Germans did, and in many cases operated them quite as well as their Teutonic neighbors.

The only country for which postwar statistics of crop yields for large and small properties separately are available is Poland. Despite the fact that the war tended to reduce the efficiency of the former more than that of the latter, the official figures for 1921 show yields of the principal crops considerably higher for large estates than for peasant farms. The difference ranges in the various sections from about 5 to 25 per cent, averaging about 10 per cent.

Notwithstanding the superiority, and in some cases the very decided superiority, of large-scale farming in eastern Europe over peasant farming, the big estate now seems doomed. It is difficult for an American not to sympathize with the peasants in their demand that the great landed properties be broken up. In most cases, the big properties have not been built up by the efficiency of their owners but are inheritances from the time when might gave right, when the peasant was a serf with no political rights, with hardly anything he could call his own. Were land abundant the peasant might have less ground for looking covetously at the holdings of the noble. With land hunger ever predominant in his consciousness his attitude is but natural.

The gain, or at least the immediate gain, to the peasant from the breaking up of the large estates is not likely to be so great as he fondly hopes. In the first place, the proportion of the arable land held by such estates is not so high as is frequently supposed. In Poland, for example, while approximately 40 per cent of the total land area was owned before the war by the big proprietors, their holdings included only about 25 per cent of the total arable land. Figures for Russia and other countries of eastern Europe were not very far different. The greater part of the forests, apart from those owned by the state, belonged to the nobility. Forests constituted a very large fraction of their land, while the peasant holdings consisted mostly of cultivated lands and pastures. In the second place, the land-owning peasant — especially the "little lander," to use a Polish phrase — who looks for increase of his holdings by the dividing of the big estates, is apt to underestimate the amount of land which must go to the landless peasants who are now hired as laborers. Altho, as already stated, there was on the large properties more land per man employed than on the peasant farms, nevertheless the laborers on the estates would necessarily take up a large fraction of their area. Finally, in those parts of eastern Europe which have suffered the greatest losses of machinery and live stock, the peasant is likely to find it difficult at first to cultivate much additional land. Of course, it is hoped that this condition will be merely temporary. It is noteworthy, however, that the eagerness of the peasants in Poland to push through immediately the partition of the big estates has been decidedly dampened by the high cost of equipping additional land.

The end of the big land holdings in Russia came quickly, rudely and without system. With the outbreak of revolution the peasants simply seized the land, appropriated the neighboring estates and divided them among the landless and land-holding peasants according to the will of the group or perhaps in certain cases according to the right of strength. They did not wait for formal methods, for laws and decrees and officials from Moscow. The question of compensation to the owners was not raised. The central Bolshevik government at Moscow had the theory that the big estates should be made into communal farms, but the peasants did not fall in with that way of thinking. A limited number of communal farms were put in operation, but their efficiency proved very low and many of them have since ceased to operate. If general political conditions in Russia once become stable it is quite possible that efforts may be made to distribute more fairly among the peasants the land formerly held by the big owners. Probably the practice of periodical redistribution will gradually cease. As nearly as can be ascertained from the very inadequate information coming out of Russia, the practice has begun to wane since the revolution. The peasants have pretty generally set their hearts on permanent ownership of the land they till. It is to be hoped also that the general upheaval may ultimately result in a thoro-going regrouping of the land holdings such that each peasant will get his land in a single piece. Comparatively little has thus far been done in this direction since the war.

In Poland a law providing in principle for the breaking up of the big estates was passed in 1919, but the detailed measures necessary for carrying out the change, especially as regards compensation of owners and financing of purchases by the peasants, have not yet been fully worked out. A certain number of estates, which belonged to the former Russian government and which were taken over by the Polish government, have been parceled out, and also a small number of estates of private owners which were found to be neglected or inefficiently cultivated. Agricultural and economic experts in Poland have hoped that in connection with the division of the large estates a regrouping of the scattered peasant holdings could be brought about. As a condition of receiving part of a large property, the peasant might be required to give up all or most of his scattered strips to his neighbors, so that in the end he would possess a somewhat greater amount of land than before and have it in one piece. It is perhaps partly by reason of the fact that the peasants realized the desirability of accomplishing this regrouping at the same time with the partitioning of the big estates that the latter itself has gone so slowly. It is evident that a scientific and just rearrangement of a multitude of land holdings is a task requiring much time and skill.

In Roumania, a law providing for the parcelation of large properties was enacted very soon after the armistice, and it has already been carried out to a much greater extent than in Poland. In Roumania, however, the former owners are permitted to retain larger tracts than is proposed in Poland. It is difficult to get accurate information as to the effects of the redistribution of land in Roumania. Government regulation of prices and of grain export, and disorganization of the railroads, have tended to restrict agricultural production, and among the complex factors affecting the situation the influence of the change in land ownership can hardly be traced.

In fact, throughout eastern Europe there are so many abnormal conditions of political and economic life that one can scarcely expect to be able to demonstrate the good or evil effects of the so-called agrarian reform for a long time to come. One is forced to fall back chiefly on general reasoning and psychology. One would naturally expect that the immediate effect of a parcelation of the big estates among the peasants would be a diminution of production. Apart from the fact that the peasants in general are less efficient farmers than the large proprietors and that small holdings lack certain advantages in methods that the large holdings enjoy, the process of distribution, especially if carried out rapidly, must involve in itself a certain amount of disorganization. During it there are likely to be lands left unused for a time; even crops already planted may fail to be harvested. On the other hand it is quite possible that the ultimate effect of the parceling of the big estates, especially when combined with an increase in political power for the peasant class, may prove beneficial to production. Even a small increase in the amount of land he holds might be expected to put new life and hope into the peasant's mind. Whereas with ten acres he could never hope to make progress, to raise his standard of living, to find means to educate his family, with twelve acres he may see the possibility of getting ahead in life. He may feel a new ambition. He may work harder than before. He may give more thought to methods of farming, and venture new experiments. When this direct effect of larger peasant holdings is combined with the influence of the possession of new political power by the peasants, to which allusion has already been made, it may readily make in the course of time for a very real improvement in the agricultural methods of the masses of eastern Europe — an improvement more than sufficient to offset the loss of the expert direction of the big estates and of the advantages of large-scale production.

E. DANA DURAND.

DEPARTMENT OF COMMERCE
WASHINGTON, D.C.
(Recently Adviser to the Polish Food Ministry)

AN EXTENSION OF VALUE THEORY

SUMMARY

Value theory moribund today, 198. — Renascence of value theory probable, 199. — Cassel's proposal, 200. — Future trend of price theory, 201. — Types of pecuniary values other than price, 203. — Actuarial valuation, 204. — Valuation under right of eminent domain, 207. — Valuation for purposes of rate-making, 208. — These valuations not special cases of price, 209. — Institutional nature of pecuniary valuation, 212. — The market has no monopoly of field of value, 217. — All valuation purposive, 219.

NEVER in the history of industrial society was value a subject of more vital interest than it is today. For a quarter of a century we have had a movement in prices which has emphasized anew the importance of the general principles underlying the causes of their rise and fall. Simultaneously the ever-growing technological and legal complexity of the industrial world has given rise to a number of new problems calling for pecuniary valuation. We have witnessed an industrial revolution during the last forty years. The consequences of that revolution for productive output, for capital accumulation, and for the development of new institutions, are just beginning to dawn upon us. One of its manifestations touches the field of value and valuation. The development of public control in the sense which that term connotes today, the taxation of income, the growth of the institution of accounting, the development of modern management both in the financial conduct of the corporation and in the supervision and direction of industrial plants, have brought into being a set of conditions which call for pecuniary valuation.

Yet the theory of value which has occupied the central place in economics since the days of Adam Smith is moribund. It is no longer an infectious subject, and a full decade has elapsed since any formal treatise on value has appeared in America. The distrust of the body of doctrine which has constituted traditional value theory during the last thirty years is not limited to students and to bumptious young economists who are indulging their hypercritical propensities. The latest European work on general economic theory begins with this unqualified declaration. "In my economic studies I long ago reached the conclusion that all the old value theory, so-called, with its endless terminological controversies and its fruitless scholasticism, is superfluous ballast of which economic theory must rid itself."[1] Such an utterance from a scholar of Cassel's standing commands respect. What he means by this terse and well-poised statement is that the controversies over marginal utility and its relation to value were futile. Economists have made an excursion into a land which gave promise but which has turned out to be barren of positive results — unless the proof that the land is barren and that it is useless to spend further time upon it be taken as an accomplishment worth while. In the eyes of the faithful even the forty years during which the children of Israel wandered in the wilderness were well spent.

It was half a century after Adam Smith before Ricardo revived the theory of value. The result was a body of literature which is still the solid core of English economic theory. Another fifty years elapsed before Jevons, in 1871, introduced the doctrine that marginal utility is the final determinant of value. This movement intrigued the minds of two generations of thinkers.

---

[1] Cassel, Theoretische Sozialökonomie, p. v.

There is reason to believe that our times will again see a renascence of value theory. It is the purpose of this article to set forth the grounds for that belief, and to indicate the direction which the new development will probably take.

The first task of any theory of value is to formulate a set of generalizations intended to explain the causes of the rise and fall of prices. It should furnish, too, a set of fundamental generalizations concerning the nature of value and the valuation process which could serve as a guide to those who are confronted with problems of pecuniary valuation which arise outside the market. This task value theory has hitherto neglected almost entirely. Finally, a comprehensive theory of value should furnish a touchstone for present-day institutions and their fitness to realize an ideal industrial program.

The first of these three propositions with respect to the scope of value theory will be all but universally accepted by economists, altho the definiteness of the task has been somewhat befogged by the course of economic doctrine during the last thirty years. The second proposition would be less readily accepted. This is due in part to a failure to comprehend its meaning arising out of the economist's neglect of all phases of pecuniary valuation except price. When the economist thinks of value theory as extending beyond the problem of explaining price fluctuations, he usually has in mind the third task, which deals with the ethical implications of economic valuation. The value theory of the last thirty years has done little to illuminate either the causes of price fluctuations, the fitness of our economic institutions to serve ideal ends or the nature of pecuniary valuation in institutions other than the market.

Some economists have proposed to remedy the situation by ridding economics of the problem of value entirely. They suggest that we abandon the term and confine ourselves to price without further concern about value. They have in mind the first task of value theory set forth above, and insist that we will make more progress toward formulating a set of relevant laws of price if we rid the science of the whole problem of value by burying it. This is the purport of the quotation from Cassel which appears at the beginning of this article. He had expressed himself to the same effect in an earlier work. "It may indeed be said that the vagueness of the term 'value' has induced people to speak on general questions of economic theory in a most careless manner; and from the confusion thus caused the science has greatly suffered.

"The most radical and effective cure for this evil would of course be to do away with the whole theory of value. Fortunately this is quite possible. There is, in fact, no reason at all why we should commence the study of economics by a separate theory of value."[2]

Professor Cassel here proposes to rejuvenate value theory by limiting it to price theory. By this delimitation the attention of economists will be directed away from the whole welter of controversy which grew out of the attempt to base value upon the utilitarian theory of conduct. In this manner he expects to direct the attention of economists to the institution through whose operation values come into being and by whose processes pecuniary value in the sense of price is determined. He realizes that it is only by returning to a study of the market and its processes that we can make price theory helpful and relevant.

Many economists are in full accord with this point of view as regards the reformation of price theory. The sooner we turn from the controversies of the old value theory and apply ourselves to a study of markets and market technique, the better will it be for price theory. Prices are the grist which markets grind; they are relative to market processes. Markets are institutions of great variety and complexity, with no such simple mechanism as was assumed by the traditional value theory. Not until we realize this and address ourselves to a study of their technique and the actual course of causation upon the various markets will we make any further advance in price theory.

---

[2] Cassel, The Nature and Necessity of Interest, pp. 68, 69.

The positive results which may be expected from such an attack are well illustrated by Cassel's treatment of the problem of the rate of interest. By attacking interest as a price problem he succeeded in discussing the whole subject within the short range of ninety pages despite the fact that he was still preoccupied with proving to the socialists that we could never have a society in which interest would not exist. All that is needed to make his work in that field complete is to extend the study of the forces which determine the market rate to all the markets for capital. Cassel discusses only the factors which govern the rate of interest on money lent for long periods, such as first mortgage loans on real property. If we had similar studies of the forces which govern the rate for call loans, for ordinary bank loans, for one to five-year notes, and for long-term bonds, we should have all that the economist needs to know about the rate of interest.

With this example before us we need to make similar investigations of the various types of markets for commodities and services. When we have acquainted ourselves with the different sorts of markets which exist today and with their varying technique, we may be able to make significant groupings and classifications of those markets. Such a study should give us helpful generalizations or laws concerning the causes which underlie the rise and the fall of prices in each of these groups. It should yield others concerning the cause of price movements in all markets. It is safe to prophesy that there will be small place in the literature which grows out of these investigations for the subject-matter and the terminology of the older controversies over value theory.

So much concerning the price theory of the future is pretty clearly established in the minds of economists. There will be great activity in the field during the next decade. The concrete studies in the technique of markets must furnish the facts out of which the laws of a more adequate theory of prices will be formulated. It is not necessary, then, to elaborate the statement that value theory in the sense of price theory will be rejuvenated in the near future.

But economic conduct is not motivated by price alone. Neither is the problem of price the whole of the field of valuation. "That Industrial Revolution," as Marshall puts it, "which has far outdone the changes of a century ago in both rapidity and breadth of movement" has made value a term of many meanings, even in the pecuniary field. An adequate theory of value for modern economics must extend beyond the realm of price and include all the problems of pecuniary valuation which our industrial process presents. These values are not special cases of price. They are ofttimes necessitated by the inadequacy of price to serve as a basis of rational conduct. They arise out of a type of situation analogous to that which occasions the more familiar types of economic valuation.

The problem of economic valuation grows out of the fact that a complete comprehension of the physical qualities of material objects is oftentimes not adequate to warrant overt conduct, but must be supplemented and reconstructed from the economic point of view before the individual is free to proceed with the rational ordering of his conduct.[3] The capacity of a material object to satisfy an end which appears in the form of a felt want is utility. One may have complete knowledge of the various ends which material objects can satisfy. But that does not yet warrant him in proceeding to overt conduct if such useful objects are scarce. Before one can proceed to use these objects they must be evaluated. When such evaluations are made by individuals they result in the subjective values of the Austrian School. When they are made on the market and come to expression in terms of a standard quantitative unit, they constitute price. The price, or market value, is something different from and objective to the utilities of the physical object.

Just so a knowledge of price is oftentimes inadequate to warrant economic conduct. When this situation arises, resort must be had to other and further methods of pecuniary valuation. The market, with its scale of prices, does not always give the information which is needed as a basis for rational economic conduct. All such valuations outside the market which come to expression in money terms are pecuniary valuations which lie beyond the sphere of price. The very fact that market value is the phenomenon which occasions the necessity for these further valuations proves that they are independent. Prices are merely the problem phenomenon which these other phases of pecuniary valuation attempt to resolve for their own ends with their own technique.

The pecuniary valuations other than price are independent values just as the economic values of useful physical objects are of a different nature from their utilities, their fitness to satisfy wants. The value of the objects is something different from their utilities, even tho there would be no occasion to value them were it not that they had utilities. Just so the evaluations which are necessitated by the fact that commodities have market values present the necessity for valuations which are themselves not market values. The mere fact that they would not exist if there were no markets in no wise makes them identical with market values. Whenever any set of objective facts, whether they be facts relating to physical property or facts relating to price, is insufficient to warrant overt action, the necessity for further evaluation arises.

---

[3] Cf. Valuation as a Logical Process, by H. W. Stuart; Studies in Logical Theory, by John Dewey, p. 231.

Two illustrations will serve to clarify this. The bond market offers the investor a bond bearing 4 per cent interest due in twenty years at $78, and a bond bearing 5 per cent interest due in twenty-five years at $86. The security of the two bonds, both as to principal and income, is equally good. In fact they are issued under the same mortgage and have equal rights against both property and income of the issuing corporation. The mere existence of these two prices does not warrant the investment in either one indifferently. It is necessary to know which of these bonds has the greater value. If one is willing to invest in a bond of this type at 6 per cent, an actuarial valuation will show that the 5 per cent bond is actually worth $10.25 more than the 4 per cent one. The difference in their market values is $8. The investor will, therefore, purchase the 5 per cent bond. At the market price the 4 per cent bond yields 5⅞ per cent, while the 5 per cent bond yields almost 6⅛ per cent. They would sell at $76.89 and $87.14 respectively if both sold to yield exactly 6 per cent.

A similar quandary is presented by the presence of two machines or other units of productive plant, which serve precisely the same physical end but have different market values. A manager has an electric generator whose second-hand market value exceeds the cost of removal by $50,000. The market offers a generator of improved type with exactly the same capacity at a cost of $250,000.

Is he warranted in replacing the old generator with a new one? The answer to that question depends upon a further pecuniary valuation of the relative economic efficiency of the two generators. If the difference in their value is more than $200,000 (the difference in their market values) the manager is warranted in discarding the old generator and purchasing a new one; if it is less than this amount he will retain his old machine. The difference in the value of the two machines considered as productive units may be $300,000, or it may be only $50,000. There is no certainty that it will be equal to the difference in their market values. The market value results from the operation of all the conditions which present themselves upon the market for electric generators; the manager's valuation results from a consideration of the factors which determine the relative economic value of the two units in the particular industrial organization which he is supervising and directing. Knowledge of market values is one of the facts which he must have in planning a rational course of procedure, but the market does not give him a set of values which are adequate to warrant that procedure without further and independent valuations.

The last example falls within the general field of depreciation. The problem of valuation presented by depreciation of plant and equipment is raised perhaps most directly in connection with the determination of income. It is a sound principle of income determination that no income arises until full provision has been made out of the gross revenues for maintaining the capital intact; in other words, until full provision has been made for depreciation of plant and equipment. Depreciation is universally defined as lessening in value. Yet nowhere have the accountants, who are the technical experts in the matter of income procedure, accepted market value as a criterion of the lessening in value of plant. They have developed their own methods of valuation, and these methods have attained to objectivity and to independent validity. They are becoming an institution of valuation. This particular phase of the value problem will be taken up for separate and complete discussion later.

Even in the taking of private property under the right of eminent domain the property is not subjected to the test of the market by being offered and sold for whatever price it will fetch. Its full and just value, which must serve as a basis for compensation to the owner, is determined by a judicial procedure according to rules, principles, and precedents which have been developed over some centuries by a gradual process of evolution. The value finally arrived at is binding and is in every way objective. It is not market value; at best it is a hypothetical market value.

There are at least four groups of these pecuniary valuations outside the market which are not cases of price, but are independent values.

1. Valuations of property for the purpose of exercising public control over prices, as in public utility rates. The valuation of property for purposes of capitalization is an analogous case.

2. Valuation of property for purposes of administering the principles of justice and equity which control the rights of property and of contract.

3. Valuations of property for purposes of taxation. These may be either in the nature of the valuation which shall serve as a direct basis for the tax levy; or they may arise incident to the determination of income when taxes are spread on the basis of income.

4. Valuations of property which arise in connection with industrial and financial management. These are necessitated by the fact that the valuations of the market are not adequate for the rational direction of industrial and financial conduct, if this is to be carried through most economically and efficiently.

Perhaps these four groups could be subsumed under two heads. The first three groups present valuations which are necessitated by the general problem of public control. They come to expression as findings of a judicial or administrative body and as such have binding force. The last group is concerned with those problems of valuation that arise in private industry in its pursuit of profit.

In addition to these there is the problem of imputation or allocation of values, revenues, and expenses, which cuts across this classification and may arise in connection with any of these groups. Not only must courts and commissions find a fair value for purposes of rate-making, but they must frequently divide that value between the property used for interstate business and that used for intrastate business. Oftentimes they are also called upon to further subdivide either the inter- or intrastate property as between that which is used for carrying freight and that used for carrying passengers. Likewise for purposes of taxation not only must the assessing authorities find, in the case of an electric light and power company whose hydroelectric plants are located in one part of a state and whose product is consumed in the manufacturing towns in another part, the fair cash value of that property for purposes of taxation; but they must parcel that value out between the various political units in which the physical property of the company is situated. The imputation of investment to various productive activities is the most difficult task presented by cost accounting.

Revenues, as well as expenses and values, present the necessity for apportionment. When a state levies taxes upon the gross earnings of a railroad which operates through half a dozen states; when the rights of the stockholders of a lessor road to receive rental depend upon the gross earnings of a portion of the road, while the great mass of traffic is joint to the lessor and lessee roads — in short, whenever the physical plant is a unit which renders an indivisible service, while the ownership or political jurisdiction is divided, this problem of imputing revenues, expenses, and values presents itself as a value problem. That is to say it presents a situation in which a knowledge of the physical factors or of the economic factors pertaining to the situation as a whole is not an adequate basis for practical conduct. Before the judicial body or the manager is prepared to decree action there must be a further judgment process which shall issue in a conclusion expressed in quantitative pecuniary terms.

Valuation for purposes of rate-making would perhaps strike the general economist as having most clearly attained to definite institutional standing. It possesses a literature, a technique, a set of principles having the force of precedent, and judicial or administrative bodies which consider themselves bound by these principles and which have power to enforce these valuations upon industrial society. A certain valuation engineer put the thing naïvely but in most illuminating fashion when he said that upon entering the valuation section of the Interstate Commerce Commission he had sought to inform himself regarding the problem of value by reading every available thing that the economists had written upon the subject. After completing this laudable undertaking he remarked that he knew nothing about value when he began, and not very much when he had finished, but he was certain that the value about which the economist was talking was not what he and his colleagues were seeking in the valuation of the railroads of the United States.

When a public utility commission is seeking a fair value upon which it may base rates, it is not looking for a price. It does not ask itself what this property is actually selling for upon the market. As one commission puts it in a decision involving rates: "When we speak of 'fair value' in a rate-making case, we find we must of necessity acquire an entirely new and distinct conception of this term 'value.' It is not a composite of all other values. Nor is it of necessity merely a modification of any of the foregoing conceptions of value, any more than a newly discovered star in the firmament is a composite of all other stars in the firmament, or a modification of any one of the same. But it is an entirely new and distinct 'value.' It may in some respects partake of the characteristics of some other values or of all other values, but nevertheless it is a conception of value for a different purpose, and is as readily susceptible of ascertainment independently of any other particular value, as such other particular value is susceptible of ascertainment independently of it." [4]

This commission is clear as to the distinctive character of the value problem with which it is confronted in a rate case. It would surely differ from one writer who asserts that "to ascertain what the word 'value' means, we must do what we should do with any other word under any other circumstances, that is, go to the dictionaries." This body realizes that the control of rates and the method of valuation suited to function for that purpose is a thing apart whose definition has in all likelihood not gotten into the standard dictionaries. It would certainly not accept the definition compounded by the above-mentioned writer from the dictionary. "Value," he says, "will be taken in its established sense as meaning the importance of the thing in question, measured by the amount of other commodities (commonly represented by money) for which it can be exchanged in open market, or the price equivalent to its intrinsic worth, which shall be a real equivalent." This commission realizes that there is no such thing as "intrinsic worth"; there is only the power to evoke a certain price upon the market or the power to evoke a certain expression of pecuniary value from some other institution like a court or a commission.

---

[4] Decision of Public Service Commission of Maryland in the Matter of the Chesapeake & Potomac Telephone Co., of Baltimore, p. 22 (by Towers, Chairman, opinion filed March 8, 1918).

The notion that properties contain a value which is the same in all institutions is the source of much of the confusion which now characterizes valuation for purposes of rate-making. Commissions in such valuations do not seek an absolute quality of the property which may be denominated its value; they are rather imposing upon the property a fair value which shall express in pecuniary terms all the equitable considerations bearing upon the determination of the mutual rights of public and owner. In arriving at that value the courts and commissions make use of certain market facts, both past and present, but what they are seeking is not a market value, but something different. It is like market value in that it is formulated to realize a purpose in the nature of an end to be attained, just as the market seeks an adjustment of supply and demand. But it is a thing *sui generis*. It has no meaning nor can it be understood except in terms of the purposes of public regulation and in terms of the technique which has been developed for arriving at a pecuniary value which shall serve that purpose.

The conflicting theories concerning the proper method for arriving at fair value vary just because the purposes which the evaluators have in mind are different. If those who are charged with making these valuations, both for the public and for the company, told us with frankness what they are seeking to accomplish their processes of valuation would be more intelligible. The extreme proponents of the companies usually seek a theory of valuation which keeps public utility investment and promotion within the field of business enterprise. What the extremists on the public side desire is a payment for the service which shall in no wise exceed what would have to be paid under a socialist régime which was as efficient in operation as is private management. These men would base value upon investment, and would allow no increment for the increases in land values, for changes in the price level, or for any other cause. They would remove the ownership of public utilities entirely from the field of business enterprise. They would make it merely a sound investment and nothing more.

It is no part of this discussion to indicate which of these two groups is right; that is largely a matter of sound public policy. One of the groups is trying to invest public utility property with all the functions which private property in any business enjoys. The other group is trying to divest property in public utilities of a large part of the function which private property in other productive plants enjoys. The difficulty in prescribing an adequate and satisfactory method of valuation which is acceptable to the courts is that they have not yet decided just what limitations are to be placed upon the right of private property in plants devoted to the rendering of public utility services.

Each of these separate phases of pecuniary valuation has a distinct function in industrial process. If the economist would understand the workings of industrial society he must master the nature and technique of the processes by which these values are created. He will never understand completely the part that value plays in industrial process until he analyzes these other values as well as price.

The consideration of these various manifestations of value has brought into prominence two characteristics of the problem of valuation which deserve further consideration. It is clear that all valuation is purposive; and that pecuniary values derive their sanction from their fitness to function in the realization of ends. Each type of value is mediated by the end which occasioned the judgment process by which it was created. It is equally clear that all pecuniary values which are not mere subjective valuations of the individual, but which attain to social validity, are institutional products. It is doubtful whether there are any objective values which are not institutional in their origin.

The purposive nature of the valuation process is beautifully illustrated by the mathematical formula employed in the determination of the present value of a series of future incomes. The mathematics of valuation has become an institution, and actuaries form an organized profession skilled in its use. A valuation derived through the use of this formula can be sustained in any court by the testimony of professional actuaries who are institutionally accredited.

It is always an interesting exercise to set students the task of explaining why the value of an annuity of $802 for twenty years is $10,000 on a 5 per cent basis; and why it declines in values $302 in the first year, $469 in the tenth year, and $764 in the last year of its life. Their answer will probably be that the formula gives a value of $10,000 at the beginning of the series and that it shows a decline in value of $302 in the first year, $469 in the tenth, and $764 in the last year. But that merely assumes that the mathematician of valuation has answered the problem and embodied his answer in the formula. We are seeking the principle which underlies and validates that formula.

The reason why $10,000 is the value of the annuity is that this figure will enable the purchaser of the annuity to accumulate his original investment out of the $16,040 paid him during the twenty years and to receive in each year an additional amount which is exactly 5 per cent of the remaining value. In the first year, for example, the owner regards $500 or 5 per cent of $10,000 as income. This leaves $302 as a return of his investment; the value of his annuity at the end of that year has decreased by this amount.

The second year he counts $484, or 5 per cent of the remaining value, as income while the other $318 is considered return of investment and decline in value. And so he proceeds throughout the twenty years. At the beginning of the tenth year the value is $6665 and he considers $333 of the $802 which he receives as income and $469 as decline in value.

His revaluation from year to year is obviously directed to the end of maintaining a uniform percentage between that portion of the $802 which is to be considered income and the remaining value of the annuity. It is just this uniform ratio of 5 per cent which the mathematician of valuation aims to attain with his formula.

Starting with the twenty annual incomes of $802 and the 5 per cent ratio he arrives at an original value and a succession of declines in value for the various years which maintains this ratio.

This is more clearly illustrated if the series of incomes is not uniform. A series beginning with $1,000 and gradually decreasing by $25 each year to $525 in the twentieth year will also have a present value of exactly $10,000. The application of the formula to this case will show a uniform decline in value of $500 per year throughout and not a gradually increasing amount, as in the case of the annuity of $802. The difference in the rate at which the value of these two annuities declines is arranged to secure a uniform per cent of income upon the remaining value in each year.

The purposiveness of this procedure is still more strikingly illustrated if we assume a series similar except that the income falls to $200 in the tenth year, and is somewhat larger in each of the other years. This series would also have a value of $10,000 at the beginning. Its decline during the first year would be somewhat more than $500, as it would in every other year, except the tenth. In that year the application of the formula of valuation would result in an increase or appreciation in value of about $100. Obviously the value of the annuity is increased in this year when the income is smaller than usual in order to preserve the income at 5 per cent of the remaining value, even in that year.

Had the payment in the tenth year been unusually large, say $1500, and that in each of the other years correspondingly smaller the formula would give a decline in value of almost $1200 in that year and so would have reduced the amount remaining as income to about $300, or 5 per cent on the remaining value.

Clearly the whole procedure is purposive, and the formula is merely a symbolic representation of the process of valuation which is necessary to realize that purpose. If the purchaser changes his decision and concludes that he will divide the payment into two portions, one of which represents return of principal, while the other is at all times 6 per cent of the remaining value of the annuity, its value will become less than $10,000. The decrease in value is directly due to the fact that the purchaser has substituted a new end for the former one; every modification of his end means a change in the value of his means.

The discussion of valuation for rate-making at a previous point in this paper indicated the purposive nature of that procedure. Likewise, in valuing property for purposes of taxation the object sought in fixing the assessed value which forms the basis of the levy is the just distribution of the burden of supporting government. Even where the tax purports to be upon the value of the property, the assessing body will commonly take congizance of its power to produce income. Thus the Pere Marquette Railroad has been for years assessed at thirty million dollars, despite the fact that its property was valued by the State Railroad Commission at over fifty millions, and that the same commission approved an issue of securities at the reorganization of the properties amounting to over $100,000,000.

Since all values are relative to and mediated by some purpose, it is entirely natural that value should have become a term of many meanings. The notion of an absolute value still persists, especially among lawyers and engineers. Among the lawyers this no longer takes the crude form of a supposed "intrinsic value" which inheres in the object as do physical qualities, but rather of an attribute which property derives from some institution of pecuniary valuation which has the force of precedent. Most commonly the value to which the lawyer appeals is market value. Sometimes it is a value arrived at by the procedure which has been prescribed by the courts when property is taken under the right of eminent domain.

It follows from this analysis of the nature of value and the processes of valuation that this attitude is logically unsound. There may be many pecuniary values for the same object. These may all be valid, each within the jurisdiction of the institution which made it.

It follows, too, that no adequate understanding of the processes of valuation and of the causes for changes in value can be had without taking into the reckoning the technique of valuation which has come to be institutionally recognized. As Professor Charles H. Cooley says,[5] "It would be as reasonable to attempt to explain the theology of St. Thomas Aquinas, or the institutes of Calvin, by the immediate working of religious instinct as to explain the market values of the present time by the immediate working of natural wants." Likewise, this would be just as reasonable as to attempt to explain the nature of fair value for purposes of rate-making by reference to the definitions of value found in economic treatises which limited their concern with value to the field of market price.

It follows also that the market has not now, nor has it ever had, a monopoly of pecuniary valuation. The fact that the market was the first institution which made pecuniary valuations; and that the courts cast the problem of rendering just compensation to an owner whose property was taken by the state under the right of eminent domain in hypothetical market terms does not limit the term value to the result of market operations. The concept of *a* market value is itself an abstraction. The valuations of the market are no more absolute and have no greater validity than those which result from the workings of any other institution of pecuniary valuation. And since the market itself developed and attained to influence and recognition only by an historical process of evolution, it is legitimate in no more fundamental sense than are other institutions of valuation which grew up later, or still others yet to come. At any time too, functions which have been left to the market hitherto may be transferred to other institutions of pecuniary valuation.

---

[5] Cooley, "Institutional Nature of Pecuniary Valuation," p. 543, American Journal of Sociology, January, 1913.

The market does not, of necessity, serve satisfactorily all the ends whose attainment we now leave to its functioning. Particularly must we scrutinize with the greatest care the assumption so complacently made by many economists that a set of market prices which brings about a proper coördination of the factors of production effects an ideal distribution of product. In adjusting production to demand the market places at the disposal of some of the owners of the factors an amount of economic power to command product which is greater than necessary to evoke the productive contribution and which is not in harmony with our ideal system of distribution. It is quite conceivable that we may establish other institutions of valuation which shall correct the workings of the market in such manner as to bring our total industrial process into closer conformity with what we consider a just distribution of income. A tax on differential profits like our excess profits tax is just such an institution. There is no reason for expecting that a set of values which is adequate and satisfactory for the motivation of production shall likewise be adequate and satisfactory for effecting a fair distribution of the product.

Perhaps the implications of this theory of value are more significant for the problems of imputation than for any other single set of problems. Take the common case of imputing the value of property used in transporting freight and passengers to these two classes of service. Pretty much all the discussions of the lawyers and of their experts, the engineers and the operating men, consist of an attempt to base the imputation of values, as well as common expenses, upon some physical factors, such as train miles, or car miles, or tons of passengers and freight transported. They attempt to base their allocations upon factors which are objectively given in the form of physical data which can be quantitatively determined. If what is here said is true, the procedure should rather be to look forward to the end which is to be attained in this imputation. Then the imputation which will finally be made will be the one which serves to accomplish that end. There will still be limiting physical factors, because the end must inevitably be conceived and worked out in terms of the available means. But where the physical means allow a wide latitude as regards possible ends, the very heart of the valuation becomes the clearly attained consciousness of the desired end. As a matter of fact the imputation is, in the last analysis, made on this basis anyhow; but a deal of time and energy is wasted and a great mass of verbiage which darkens counsel by words without wisdom is injected into the discussion by a failure to realize the fundamental nature of the value problem.

Some men realize this perfectly, as witness the following statement of a practical railroad man. "These computations, then, consist of two processes. One is allocation, which is the ascertainment of facts; the other is apportionment, which is the determination of policy.... In determining the propriety of proposed bases of apportionment we must have an eye, not only to the facts studied, but to the purpose of the study. It is possible, and indeed probable, that if two cost studies are made of the same traffic on the same railroad at the same time, one for one purpose and the other for another, different bases of apportionment of the same joint expenses should be used."[6]

Finally, this point of view concerning the fundamental nature of value gives us a touchstone for the values created by the workings of the institutions of pecuniary valuation. The student was never quite satisfied with the statement that value was price. To him value always seemed something more fundamental, something which furnished a criterion for passing judgment upon prices. Once we recognize that all valuation is purposive we have a test for the validity and sufficiency of any institution of pecuniary valuation like the market or the court sitting in a rate case. If the values which result from the working of these institutions function perfectly to realize the end which they are intended to serve they are true values. If not, the institutions which created them must be modified or supplemented by new ones.

Thus far the economist has held aloof from this field because the problems have not fallen within the bounds of traditional value theory. As a result both the public and the economist have suffered loss. He is better equipped and can bring to bear upon these problems more that is relevant, both as to point of view and method, than the people who are essaying to solve them today. If he brings to bear upon them his understanding of economic relations and his method of analysis, we are certain to have a renascence of value theory.

DAVID FRIDAY.

---

[6] Allen S. Olmstead, Annals American Academy, vol. 63, pp. 218, 219.

INTERNATIONAL TRADE UNDER DEPRECIATED PAPER. THE UNITED STATES, 1862–79

SUMMARY

I. The greenback currency period affords a favorable opportunity for a statistical investigation of international trade under depreciated paper. — This investigation to be correlated with recently advanced theory, 221. — II. The international account of the United States from 1862 to 1879, 230. — III. Contrast of changes in the value of gold in the United States with contemporaneous changes in foreign countries, 235. — Dependence of these changes on international loans, 241. — IV. Fluctuations in the merchandise balance and the relation of these to loans and the value of gold, 245. — V. Comparative prices of export, import and domestic commodities and their relation to fluctuations in the value of gold, 249. — Contrast with English prices, 258. — VI. Comparison of wages in industries affected by movements in the value of gold with those unaffected by such movements, 265. — VII. Conclusion, 272.

I. The Problem

This article presents the results of a statistical study of prices in the United States in the greenback period, 1862–79. The purpose of the study was to subject to an inductive test the theory of international trade under depreciated paper advanced by Professor Taussig in the issue of this Journal for May, 1917.[1] In developing his theory Professor Taussig assumed hypothetical conditions such as were actually realized to a very considerable degree in the international trade of the United States from 1862 to 1879, when the inconvertible greenbacks were the basis of our monetary system. A favorable opportunity was thus presented for submitting the theory to the test of historical data. The price statistics available for the study were good, and were gathered in convenient form in Wesley C. Mitchell's book on *Gold, Wages, and Prices Under the Greenback Standard.* Other necessary statistics were derived from the Reports on Commerce and Navigation and the reports of the Secretary of the Treasury for the period covered by the study.

---

[1] "International Trade Under Depreciated Paper. A Contribution to Theory," Quarterly Journal of Economics, vol. xxxi, No. 3, pp. 380 et seq.

The problem is this: by what means and in what manner is equilibrium of payments maintained in the course of international trade between countries one of which is on an inconvertible paper monetary basis; or, having been disturbed, by what means and in what manner is equilibrium again restored? In such a case equilibrium cannot be established by the flow of gold hither and yon in the way made familiar by the classical theory of international trade. Professor Taussig suggests that under inconvertible paper it is attained by a shifting in the commodity side of the price equation in lieu of a shifting in the money side. The ultimate adjustment is reached through a series of transitional price changes, affecting in contrasting ways export, import and domestic commodities, and operating to increase or decrease the aggregate of commodities exchanged within the country, and as a consequence, lowering or raising the whole price level to a point which will maintain equilibrium.

The method and sequence of events leading up to this consummation may perhaps best be illustrated by means of the example used in the original exposition. Assume that the trade between two countries, Great Britain and the United States, is simple (that is, a trade in commodity merchandise only) and is at equilibrium, the specie value of the imports balancing the specie value of the exports; that Great Britain has a gold monetary standard while the United States is using an inconvertible paper currency; that the premium on gold in the United States measures the real depreciation of its paper as shown by the advance in general prices beyond the level at which they would be under a gold standard; that a settled state of trade exists; that this settled state is then disturbed through heavy and continuous borrowing by the United States in Great Britain.

The train of effects to be expected upon this disturbance would be, in the United States, as follows:

A. Immediate effects:

(1) Increased demand for New York exchange in London, increased supply of sterling exchange in New York.

(2) Fall in sterling exchange in New York.

(3) Fall in the specie premium in the United States. Sterling exchange is, in the circumstances, equivalent to gold, and sterling exchange and the gold premium will fluctuate together.

(4) Fall in the (paper) prices of exported commodities. The prices of these commodities are set in foreign markets in gold. The premium on gold having fallen the (paper) prices of exports must fall with it.

(5) Lowered cost (in U. S. paper) of imported commodities. These are bought in foreign markets for gold (or its equivalent) and it takes less of the paper currency than formerly to buy the same amount of gold and therefore of imported commodities.

(6) Fall of the specie premium as compared with the general price level. In the stage of equilibrium assumed at the outset, the specie premium would have been in accord with the real depreciation of the currency which, in fact, it measured. It is now less. The prices (in paper) of exported commodities have also fallen as compared with the general price level. The same is true of the prices (paper) paid for imported commodities.

B. Transitional effects:

(1) Exporting industries are unprosperous: exports tend to decline as a consequence of lower sale prices (paper).

(2) Importing industries are prosperous: imports tend to increase as a consequence of lower cost prices (paper).

(3) Export trades tend to cultivate the home market, more domestic commodities are made and a larger share of exportable commodities is used and bought at home: import trades develop and more imported commodities come in. The upshot is an increase in the total volume of commodities bought and sold in the United States.

C. Ultimate effects:

(1) A fall in general prices in the United States. The volume of commodities has increased, the money supply (assuming that there have been no new issues of paper) is unchanged: general prices will therefore fall. Even tho the paper money has increased in volume, there will be a fall in general prices relative to the price of gold.

(2) A gain to the people of the United States through lower prices of both domestic and imported goods, money incomes remaining the same throughout.

The course and causes of equilibrating movements with one of the countries on an inconvertible paper monetary basis are distinctly different from those which would obtain if both countries were on a gold basis; the ultimate effects, while different in form, are in substance very much the same.

The resemblances and differences will be evident on a comparison of the sequences of events to be expected under a gold and under a paper régime respectively, a comparison presented in parallel columns herewith.

Sequence of events in the United States when —

Both countries are on a gold basis	*The U. S. is on an inconvertible paper basis*
(1) Sterling exchange falls in New York: New York exchange rises in London.	(1) Sterling exchange falls in New York: New York exchange rises in London.
(2) Influx of gold from Great Britain.	(2) The gold premium (in terms of United States currency) falls as compared with the general price level.
(3) General prices rise, while they fall in Great Britain.	(3) Fall in the (paper) prices obtained for exports: imports obtained more cheaply (in United States currency).
(4) Exports decrease: imports increase.	(4) Exports decrease: imports increase.
(5) Equilibrium restored: General prices higher (if it is assumed that the import of gold has been proportionately greater than the consequent increase in the importation of commodities).	(5) Equilibrium restored (with exchange on a new level). General prices lower (if it is assumed that there have been no new issues of paper money).
(6) Money incomes higher, prices of imported goods lower. The people of the U. S. gain as buyers of imported commodities. The terms of international trade have shifted in their favor.	(6) Money incomes the same; general prices lower. The people of the United States gain as buyers of both imported and domestic commodities. The terms of international trade have shifted in their favor.

With both countries on a gold basis, adjustment toward an equilibrium of the international account is reached by a movement of gold affecting *all* prices; when one country is on an inconvertible paper basis this adjustment takes place, independently of any gold movement, by means of a price adjustment effected by a change in the commodity rather than in the money side of the price equation, this change itself being brought about by movements in foreign exchange which affect the prices of export, import, and domestic commodities in different ways.

Many of the conditions assumed in the exposition of the theory were actually present in the period from 1862 to 1879. Thus Great Britain was throughout the period upon a gold basis while the United States was using inconvertible paper money. From 1863 to 1874 the United States borrowed heavily and continuously in Great Britain. Other conditions of the hypothesis were largely realized by 1866, when the disturbances caused by the Civil War began to subside. The premium on gold, which during the war had been greater than the general advance in prices, fell rapidly, and late in 1865 reached the level of general prices and measured fairly the real depreciation of the currency. The liquidation brought about by the war tended to simplify international trade and to reduce the complexities which accompany credit operations, so that a state of external trade as "settled" as is ever likely to occur under modern conditions was probably realized in the year or two succeeding the signing of peace in 1865. External trade at this time was simple, composed largely of merchandise (including gold and silver, which are "merchandise" to a country with an inconvertible paper monetary system), while exports and imports approximately balanced each other. The transactions which come under the head of merchandise amounted, in specie values, in the year ending June 30, 1865, to $265,000,000 of imports and $245,000,000 of exports; while for 1866 the figures are $477,000,000 and $450,000,000 respectively.

For the whole period 1862–79, the items of importance for the present purpose entering into the international account of the United States may be grouped as follows: (1) commodity exports and imports; (2)

gold and silver coin and bullion movements; (3) freight payments; (4) sales of ships; (5) loans; (6) interest payments and repayment of loans. Such items as rents, wages, profits, expenditures of tourists, remittances to relatives, the capital of immigrants, insurance, and services of various sorts, proved on investigation either to be offset by counterclaims of the same sort or to offset each other, or were so small as to be negligible. Of the six enumerated important factors in the situation, the fifth, loans, was introduced during the period studied, and eventually in such volume as to dominate the situation. With no other factor can one correlate the shifts in the balance of merchandise (including gold and silver) from a slight annual excess of exports prior to and during the early years of the war, to a very considerable annual excess of imports in the decade 1864 to 1873 (one year excepted), and back again to a large annual excess of exports from 1873 onward. On the other hand the trade movement does correlate closely with this factor of loans. Borrowing on a large scale was initiated in 1863 and severely checked after the panic of 1873. The period as a whole thus presents for consideration and comparison two contrasting situations, in one of which a new factor, borrowing, causes a disturbance of a preëxisting equilibrium, sets in motion equilibrating forces, and is suddenly interrupted to bring about the converse situation, in which the equilibrating forces are evoked by the practical cessation of the borrowing as contrasted with its initiation. The new situation may, therefore, be expected to show the reverse movement to that which appeared in the preceding stage. If it be found that the actual results in the former of the two situations are such as the theory would lead us to expect, such evidence of the validity of the theory as this affords will be immensely strengthened if the results are neutralized or reversed in the latter. Our problem is to present and compare with theoretical expectation these actual results, the whole situation being brought always to the factor of loans as the touchstone.

A further word of explanation is desirable concerning the differences between the short-range and long-range phenomena. In the period from 1863 to 1873 the immediate, the transitional, and the ultimate effects of borrowing were being worked out synchronously. On the other hand, the cessation of borrowing and the increasing scale of repayment of loans from 1874 to 1878 were evoking, synchronously, just the converse immediate, transitional and ultimate effects. Moreover these several effects in either period tend in some degree to neutralize each other.

Thus the short-range effect of a large new loan placed by the United States in Great Britain is (by its influence upon the exchanges and its tendency to depress the gold premium in the United States) to make imports cheap (in terms of paper currency), and so stimulate imports from Great Britain into the United States; but the long-range effect of increased imports from Great Britain into the United States is to raise prices in Great Britain and to lower them in the United States, and so set up a counter tendency in the movement of merchandise.

The immediate effect of the loan is, again, to lower in the United States the (paper) prices of export commodities, since their price is set in the foreign market in gold and the same amount of gold will be represented by a smaller amount of the paper currency than before the fall in the gold premium. The (paper) prices to consumers of commodities imported into the United States will, as shown above, also fall as a result of the loans, tho less quickly than will the prices of export commodities. The reason for this laggard fall in the prices of imports is that while imports are obtained at immediately cheaper prices by importers, it takes time for competition to work out its effects in lower prices to consumers, and so the paper prices of import commodities will not respond as rapidly to a change in the gold premium as will those of export commodities, which are affected immediately.

The (paper) prices of import and export commodities having fallen, the prices of domestic commodities will be relatively high. This will hold during the short-range and early transitional periods. But the ultimate effect in the United States is a lowering of all prices, and the prices of domestic commodities, which have been hitherto relatively high, will now tend to fall at a more rapid rate than the prices of export and import commodities, and this effect may even appear as a rise in the prices of the latter.

When, then, borrowing is continued over a long period, the long-range or ultimate effects of the borrowing of former years are working themselves out at the same time as are the short-range effects of borrowing operations only shortly before consummated, and these effects tend to neutralize each other. It is always a question which is the dominant factor. But long-range or ultimate tendencies are disturbed by so many newly-arising phenomena of every sort that their effects can seldom be traced with precision, and the attempt to do so is almost certain to be unsuccessful. On the other hand, short-range effects offer a much more hopeful field, since cause and effect can be more accurately associated and the influence of disturbing factors can be more readily obviated in a short than in a long period.

Whenever, in the period here studied, the scale of borrowings is increased largely, the short-range effects may be expected to dominate the situation for the time being;

whenever borrowings are maintained at an unaccelerated rate the long-range effects are likely to come strongly into play, more especially as the immediate effects of increasing interest payments tend to neutralize the short-range effects of the borrowing operations in the same manner as do the ultimate effects of these borrowings.

When borrowing ceases, and especially when repayment begins, exactly the reverse processes of course tend to establish themselves. It is unnecessary to trace these in exact detail, one simply needs to substitute the effect opposite to that already presented here.

In such a period as that of 1862–79 short-range effects might be expected to be prominent, and ordinarily predominant, since these years were broken in such a way as to present a peculiarly favorable opportunity for the operation of short-range tendencies. Borrowing began on a large scale in 1863 and was maintained for about five years at about the same rate. In 1868–69 it was very largely increased, so that just when the long-range effects might be expected to become dominant short-range effects were given a new impetus. In 1873 occurred a panic, a complete shift in the merchandise balance of the United States, and the relative cessation of borrowing. This just reversed former conditions and again gave predominant importance to short-range effects. Thus throughout the whole period the long-range effects would probably just be beginning to dominate the situation at the end of each of the three stages 1863–68, 1868–73, 1873–78, when their influence would be overthrown by the phenomena of the period succeeding them, whereas transitional effects would be the dominating factor practically throughout, being gradually modified and counteracted, as each period wore on, by the functioning of the long-range forces.

For this reason attention has been largely concentrated on transitional effects. Ultimate effects will be noted only on those dates at the close of the stages above indicated when they may be expected to be dominant.

II. The Trade Balance, 1862–79

Interpretation of the international trade situation from 1862 to 1879 requires first a knowledge of what that situation was. The table on page 231 presents this situation in the form of an international balance sheet, showing merchandise exports and imports, gold and silver coin and bullion movements, freights payable and receivable, sales of ships, net interest payments and repayment of loans. These, as has been pointed out, are the significant items for the period studied. No data exist adequate to permit of even a reasonable conjecture on the quantitative importance of other items; but since such evidence as is available goes to show that the debits and credits of these items of minor importance approximately balanced each other, it seemed best to omit them altogether.

The balance sheet shows:

(1) An approximate balance of total debits and credits, independently ascertained, for the whole period 1860–78. This goes to show that any items omitted were of negligible importance.

(2) After the war years, a tendency appears toward the extinction of a debit or credit balance running a year or two, by a balance of the opposite complexion, lasting for a similar short period only. This means that unsecured credits for any lengthy period were not granted by either party to the international exchange. (1) and (2) together are evidence of the effectiveness of the equilibrating forces.

INTERNATIONAL TRADE BALANCE SHEET (SPECIE VALUES IN THOUSANDS OF DOLLARS)[2]

UNITED STATES IN ACCOUNT WITH FOREIGN NATIONS

	Dr.						Cr.					
Year ending June 30	Merchandise imports	Gold and silver specie and bullion imports	Freights payable	Net interest payments	Repayments on loans	Total debits	Merchandise exports	Gold and silver specie and bullion exports	Freights receivable	Sales of ships	Loans floated	Total credits
1860	$353,616	$8,550	$13,400	$18,000	....	$393,566	$333,575	$66,545	$27,908	....	$15,000	$443,028
1861	289,310	46,339	13,410	18,000	....	367,059	219,553	29,790	17,997	....	10,000	277,340
1862	189,356	16,415	11,349	15,000	$25,000	257,120	190,670	36,886	12,418	$4,710	....	244,684
1863	243,335	9,584	14,317	12,000	25,000	304,236	203,963	64,156	9,860	8,885	....	286,864
1864	316,447	13,115	24,835	15,000	....	369,397	158,837	105,395	6,724	12,034	80,000	362,990
1865	238,745	9,810	17,417	24,000	....	289,972	166,029	69,643	4,956	5,333	75,000	320,961
1866	434,812	10,700	32,247	30,000	....	507,759	348,859	86,043	15,483	....	70,000	520,385
1867	395,761	22,070	30,062	36,000	....	483,893	294,505	60,868	13,079	....	74,000	442,452
1868	357,436	14,188	24,865	42,000	....	437,489	281,951	93,783	12,868	....	76,000	464,602
1869	417,506	19,807	30,051	52,000	7,418	526,782	286,117	57,137	11,429	....	129,500	484,183
1870	435,958	26,419	30,914	61,000	15,240	569,531	392,771	58,154	16,506	....	145,000	612,421
1871	520,223	21,270	36,302	67,000	16,166	660,961	442,819	98,441	17,151	....	116,400	674,811
1872	626,595	13,743	44,541	72,000	14,994	771,873	444,177	79,877	15,139	....	127,400	676,593
1873	642,136	21,480	47,180	78,000	2,815	791,601	522,479	84,608	15,049	....	147,600	769,736
1874	567,406	28,454	40,532	60,000	....	696,392	586,282	66,629	15,713	....	51,000	719,624
1875	533,005	20,900	38,294	63,000	....	655,199	513,442	92,132	13,962	....	20,200	649,736
1876	460,741	15,936	32,113	60,000	50,000	618,790	540,384	56,505	14,839	....	....	611,728
1877	451,323	40,774	32,956	55,000	100,000	680,053	602,474	56,161	15,404	....	....	674,039
1878	437,051	38,437	30,749	45,000	150,000	701,237	694,865	33,739	16,318	....	....	744,922
					Grand Total.........	$10,082,910						$9,981,099

---

[2] This balance sheet, the basis of the study, was prepared after a comprehensive examination of sources. All figures are in gold values. Paper prices, where they occurred in the statistics, were reduced to their gold equivalents at the rate of premium on gold prevailing at the period which the quotation covers. Quotations of merchandise and of specie and bullion exports and imports are based on government statistics, and the figures on sales of ships are derived from government reports. All other figures are estimates computed from unofficial sources such as the Commercial and Financial Chronicle, Bankers' Magazine, London Economist. Each set of figures has been determined quite independently of any other.

(3) The trade in merchandise is sharply divisible into two contrasting periods preceded by a third — the early war period. This early period will be ignored as too disturbed by incalculable factors to permit of significant inferences. The two later and more significant periods which will henceforth be designated Period A and Period B, the one extending from 1864 to 1873 and the other from 1874 to 1878, show respectively a large and consistent annual excess of merchandise *imports* averaging about $105,000,000 during Period A, and a large and consistent annual excess of merchandise *exports* (after a two-year transition interval in 1874 and 1875 when merchandise exports and imports approximately balanced), averaging about $163,000,000 during Period B.

(4) During the period of heavy borrowing the net export of gold was large. This was to be expected, inasmuch as the borrowing tended to depress the premium on gold and thus to make it relatively cheap. Note that just the opposite trend would be expected under a gold régime. A reverse movement in the precious metals appears in 1877 and 1878. This movement corresponded with an appreciation in the value of gold which brought it up to and beyond the general level of prices for the first time since 1865.

(5) There was heavy selling of ships in 1862, 1863, 1864, and 1865. By 1863 the effect on the earnings of freighters was to change that item of the international account from a credit to a debit, amounting in the years of large imports to a net of about $25,000,000, and falling to about $15,000,000, when exports began greatly to exceed imports, for then the bulk of the freight charges began to fall on the foreign importers, who paid them to foreign carriers, the item consequently not appearing in the international balance sheet.

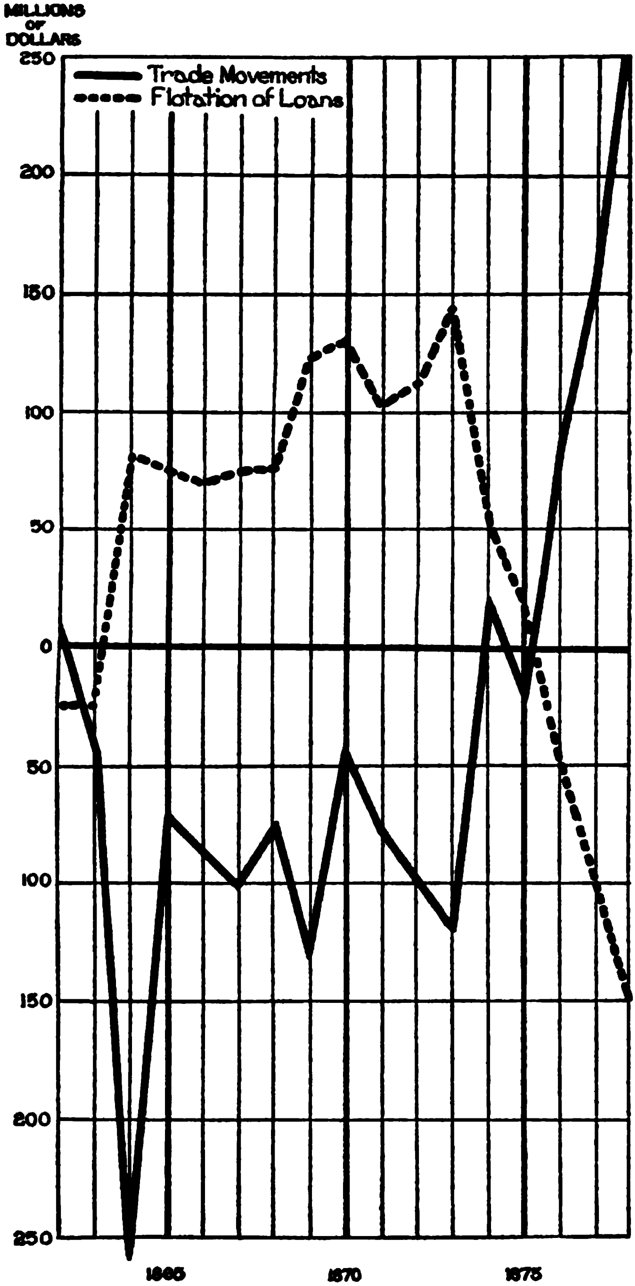
(6) As compared with the period before 1860, there is

an increase in the period 1864–73 in the debits of the United States, both on merchandise account and on freight payments. From 1873 to 1878 the merchandise debit shifts to a credit, the export and import of precious metals tend to converge, while freight payments remain a reduced debit, the net effect being to change a large debit balance on these items in the earlier period into a large credit balance in the later.

(7) The makeweight in these vicissitudes is the factor of loans, the balance on financial account tending to offset the balance on commercial account. Thus large loans were placed by the United States in Europe in 1863, and the merchandise exports of the year ending June 30, 1864 exceeded merchandise imports of that year by the unprecedented sum of $157,000,000, being almost exactly double the value of the exports. And so throughout, till 1873. Large loans and a large excess of merchandise imports go together. Loans were so sharply curtailed after 1873 that they cease to be significant as a credit, and a little later the movement of securities begins to be reversed. By 1876 they are being reimported into the United States, thus inversely corresponding with the coincident change in merchandise account which was now showing a large excess of merchandise exports.

The chart on page 234 brings out clearly the close correlation of merchandise movements and the borrowing operations.[2a] The merchandise movements were of course a function of prices, prices of goods entering into international trade hung on the value of gold, and the value of gold (in terms of greenbacks) was affected by the borrowing operations. The next step, therefore, is to investigate movements in the value of gold.

[2a] The black line represents the balance of trade on merchandise account, excess of imports being shown below the zero line and excess of exports above it. The dotted line represents the movement of securities, excess of borrowing being shown above the zero line, excess of repayments below it.


MILLIONS OF DOLLARS
250
200
150
100
50
0
50
100
150
200
250
Trade Movements
Flotation of Loans
1865
1870
1875

III. THE VALUE OF GOLD IN THE UNITED STATES AND IN FOREIGN COUNTRIES

The first effect to be expected as a result of the large borrowings inaugurated by the United States in 1863 was an increased offering of sterling bills in the New York market, with a consequent fall of sterling exchange in New York. The American securities sold steadily in Europe from 1863 to 1873 tended to depress sterling exchange in New York, and continued to do so until a new adjustment of trade should be reached, the balance being again restored by an increase in imports relatively to exports. Preventing any such restoration of equilibrium were the recurring large new borrowings. One would therefore expect sterling exchange in New York in this period to be pretty constantly depressed. Sterling exchange being depressed in price, its equivalent, gold, would be depressed also. Since gold was a merchandise commodity in the United States during the paper régime, one would expect, from this depression, that its price in the paper currency of the day would be lower than the index number of commodity prices in general, relative, at any rate, to its price under a similar comparison made previous to the borrowing operations.

After borrowing had been severely curtailed following the panic in the fall of 1873, had practically ceased a year or two later, and repayment of loans had begun, the opposite movement in the value of gold is the expectation of theory; the value of gold ought to rise from a point below that of general commodity prices to some point above it.

Further, if any movement which appears in the value of gold is to be attributed to the borrowing operations and to nothing else, a comparison of its movement in the

United States with that of its movement in other countries must be instituted, for the purpose of seeing whether such movement in the United States was peculiar to this country and thus attributable to the special factor of loans.

The remainder of the present section will be devoted to an investigation of the actual movement of the price of gold as compared with the price of commodities in general in the United States, and to a comparison between the movements in the value of gold in the United States, thus shown, with its value in the two foreign countries most important in the international trade of the United States at the time — England and Germany.

The exhibit, Table A on page 237, presents the movements in the price of gold in the greenback currency, in contrast with the index number (median) of commodities in general in the United States.

Comparing the price of gold with the index number of general commodity prices in the United States, as shown in Table A, the following significant facts appear.

(1) From April, 1865[3] till July, 1876, the quarterly average price of gold is *lower* than the index number for commodities in general.

(2) From July, 1876 to the end of the period (with two exceptions, January and April, 1877), the quarterly average price of gold is *higher* than that of commodities in general.

(3) After 1874 there is a *relative* rise in the price of gold.

(4) The most rapid fall in the price of gold (the period before April, 1865 being ignored) appears in the year October, 1869 to October, 1870. Reference to the table

---

[3] Conditions before this date were, of course, dominated by the fact that war prevailed and are, therefore, too disturbed to form a satisfactory basis for any inferences applicable to our purpose. Therefore, 1866 is taken as the originating year throughout this study.

Table A. Average Price of Gold and the Median Price of Commodities in General in the United States
1862–79

Year	Month	Av. price of gold	Median price of commodities	Year	Month	Av. price of gold	Median price of commodities
1862	Jan.	102.5	100	1871	Jan.	110.7	133
"	Apr.	101.5	100	"	Apr.	110.6	131
"	Jul.	115.5	100	"	Jul.	112.4	130
"	Oct.	128.5	111	"	Oct.	113.2	129
1863	Jan.	145.1	125	1872	Jan.	109.1	133
"	Apr.	151.5	137	"	Apr.	111.1	140
"	Jul.	130.6	134	"	Jul.	114.3	130
"	Oct.	147.7	135	"	Oct.	113.2	133
1864	Jan.	155.5	156	1873	Jan.	112.7	135
"	Apr.	172.7	169	"	Apr.	117.8	137
"	Jul.	258.1	194	"	Jul.	115.7	130
"	Oct.	207.2	200	"	Oct.	108.9	131
1865	Jan.	216.2	216	1874	Jan.	111.4	130
"	Apr.	148.5	190	"	Apr.	113.4	129
"	Jul.	142.1	158	"	Jul.	110.0	130
"	Oct.	145.5	175	"	Oct.	110.0	130
1866	Jan.	140.1	182	1875	Jan.	112.5	127
"	Apr.	127.3	173	"	Apr.	114.8	125
"	Jul.	151.6	181	"	Jul.	114.8	121
"	Oct.	148.3	173	"	Oct.	116.4	120
1867	Jan.	134.6	169	1876	Jan.	112.8	117
"	Apr.	135.6	166	"	Apr.	113.0	115
"	Jul.	139.4	150	"	Jul.	111.9	110
"	Oct.	143.5	162	"	Oct.	109.7	108
1868	Jan.	138.5	158	1877	Jan.	106.3	114
"	Apr.	138.7	162	"	Apr.	106.2	108
"	Jul.	142.7	154	"	Jul.	105.4	100
"	Oct.	137.1	159	"	Oct.	102.8	102
1869	Jan.	135.6	159	1878	Jan.	102.1	99
"	Apr.	132.9	159	"	Apr.	100.6	96
"	Jul.	136.1	158	"	Jul.	100.5	90
"	Oct.	130.2	153	"	Oct.	100.5	94
1870	Jan.	121.3	147				
"	Apr.	113.1	140				
"	Jul.	116.8	132				
"	Oct.	112.8	135				

on page 231 will show this to have been the year of greatest acceleration in borrowing. The fall in the price of gold at this time is the more significant in view of the corner in gold established in New York in September, 1869, by means of which gold was raised temporarily almost 30 points in price.

(5) The most rapid rise in the value of gold after 1867, is in the year October, 1874 to October, 1875. Reference to the table on page 231 will show this to have been the year when borrowing was dwindling to the zero point.

These facts correspond pretty closely with the expectation of theory, which would look for a depression in the value of gold as a result of heavy borrowing operations running through the period 1863–73, and an elevation of its value as a result of diminished borrowing and repayment of loans from 1874 to 1878. Detailed consideration will be given to this movement in the value of gold after the results of Table B (page 239) have been examined. Thus far, only the broad sweep of the movement has been noted. Fluctuations within the major movement will appear from a contrast of the value of gold in the United States in individual years with that of its movement in the same years in England and Germany, and on these minor fluctuations the theory will be brought to bear.

Table B shows movements in the value of gold in the United States in contrast with England and Germany. Concentrating attention on columns 4 and 5, 7 and 8, 10 and 11 as most significant, let us note the following.

(1) In 1866 gold depreciates in the United States. This movement is paralleled, but not equaled, in England and Germany; that is to say, there is a relative depreciation in the United States.

(2) In 1867 and 1868 gold shows a strong tendency to appreciate in the United States with no such pronounced tendency in England or Germany.

(3) In 1869 and 1870 gold depreciates in the United States in both years, while in England it remains stationary and then appreciates, and in Germany it first depreciates and then appreciates by the same amount.

TABLE B. MOVEMENTS IN THE VALUE OF GOLD IN THE UNITED STATES, ENGLAND, AND GERMANY 1862–78

	United States					England			Germany		
	1	2	3	4	5	6	7	8	9	10	11
Date	Price of gold in greenbacks	Medians of prices of 92 wholesale commodities (average of quarterly quotations)	Percentage of commodity prices to price of gold	Yearly percentage appreciation of gold	Yearly percentage depreciation of gold	Medians of prices of wholesale commodities	Yearly percentage appreciation of gold	Yearly percentage depreciation of gold	Medians of prices of wholesale commodities	Yearly percentage appreciation of gold	Yearly percentage depreciation of gold
1862	113.3	102.7	90.6	...	...	96	...	...	99	...	...
1863	145.2	132.7	91.4	...	0.9	94	2.1	...	98	1.0	...
1864	203.3	179.7	88.4	3.4	...	96	...	2.0	100	...	2.0
1865	157.3	184.7	117.4	...	24.7	98	...	2.0	100	...	...
1866	140.9	177.2	125.0	...	6.1	100	...	2.0	104	...	3.9
1867	138.2	161.7	117.0	6.8	...	100	...	...	102	2.0	...
1868	139.7	158.2	113.3	3.3	...	99	1.0	...	103	...	1.0
1869	133.0	157.2	118.2	...	4.2	99	...	...	105	...	1.9
1870	114.9	138.5	120.5	...	1.9	95	4.2	...	103	1.9	...
1871	111.7	130.7	117.0	3.0	...	102	...	6.9	105	...	1.9
1872	112.4	134.0	119.2	...	1.8	107	...	4.7	112	...	6.3
1873	113.8	133.2	117.0	1.9	...	107	...	...	113	...	0.9
1874	111.2	129.7	116.6	0.3	...	103	3.9	...	108	4.6	...
1875	114.9	123.2	107.2	8.8	...	97	6.2	...	108	...	...
1876	111.5	112.5	100.9	6.2	...	94	3.2	...	106	1.9	...
1877	104.8	106.0	101.1	...	0.2	98	...	4.1	106	...	...
1878	100.8	94.7	93.9	7.6	...	88	11.4	...	98	8.2	...

NOTE: Prices of commodities in 1860 are taken as the base = 100. Gold at this date would also, of course, be equal to 100. The yearly average price of gold is compared with the yearly average of the prices of 92 wholesale commodities (obtained by averaging the quarterly medians of these prices). The percentage of commodity prices to prices of gold is then shown. Columns 4 and 5 show the yearly per cent appreciation or depreciation of gold as compared with the prices of wholesale commodities. Columns 6–8 and 9–11 give for England and Germany respectively, the medians of relative wholesale prices (prices in 1860 being taken as the base = 100) and the percentage appreciation or depreciation year by year of the value of gold in those countries. Computations are based on data obtained from Mitchell, Gold, Wages, and Prices, pp. 4, 23, 29, and 30.

Summing this up, it appears that there was a relative depreciation in the United States in both years as compared with England and Germany.

(4) In 1871 there is an appreciation in the United States and a depreciation in England and Germany.

(5) In 1872 depreciation is shown in all three countries. This depreciation was more pronounced abroad than at home — a relative appreciation in the United States.

(6) From 1873 to 1878 gold shows a general tendency toward appreciation in all three countries, with the exception of the year 1877. This appreciation is in general more marked in the United States than in England and Germany — a relative appreciation in the United States.

(7) Gold was depressed in value in the United States as compared with Germany from 1866 to 1874 (inclusive) (cf. columns 3 and 9), and elevated from 1875 to 1878. As compared with England (columns 3 and 6) gold was depressed in value in the United States throughout, but shows a relative rise from 1875 onward.

(8) From 1869 to 1873 the movement of the value of gold in the United States and in England is usually in opposite directions, appreciation in the one country being matched by depreciation in the other and *vice versa*. Thus in 1869 and 1870 gold depreciates in the United States, while it remains stationary and then appreciates in England; in 1871 it appreciates in the United States and depreciates in England; in 1872 there is a mutual depreciation, but considerably more prominent in England than in the United States; in 1873 an appreciation in the United States with a stationary status in England.

(9) In this period, 1869–73, the movement of the value of gold in Germany approximates its movement in England, and, as in England, shows an inverse movement to

that in the United States. In one year indeed, 1869, the movement of the value of gold in Germany corresponds to that in the United States, while there was no change at all in its value in England in this year; but in 1873, when gold likewise did not change in value in England, the movement in Germany was in the opposite direction to that in the United States. The movement of gold values in Germany shows as strong a tendency opposite to that prevailing in the United States as does the movement in England at the same time.

Recall now the theory here applicable. The price of gold in the paper basis country will reflect changes in the general situation much more quickly than will the prices of commodities. In studying movements in the value of gold we may, therefore, expect to find effects following quickly upon causes, much more quickly than in the less sensitive merchandise market. Our theory has it that the depreciation in the value of gold which is the immediate effect of heavy borrowing will be followed by a train of consequences (increased commodity imports, decreased commodity exports, and so on) which will have as its own effect an *appreciation* in the value of gold. Borrowing operations of intermittent character would, therefore, be expected to result first in a depreciation of the value of gold and then in an appreciation. As regards continuous, unaccelerated borrowing, equilibrium of payments and equilibrium in the exchanges having been established on the basis of a certain constant annual value of loans placed, gold after its initial depreciation will tend (as a result of the operation of the long-range forces) again to appreciate, provided that the only new borrowing is that which is normal to the new equilibrium. In order that gold should depreciate further after it has reached its level under the new equilibrium, the scale of borrowing must be *increased.*

The actual movement of the premium on gold supports the theoretical expectation. The war years are of little significance, the premium on gold being largely dependent upon the degree of confidence which was felt in the success of the North. Things did not settle down till 1867. Refer now to Table B and note how the depreciation and appreciation of gold values corresponds with the flotation of loans by the United States in the London market as shown in the balance sheet on page 231. Gold appreciated in value in 1867 and 1868 when the long-range effects of the loans inaugurated in and continued since 1863 would be expected to be dominant, the borrowing in 1867 and 1868 being no more than was normal to the new equilibrium. A great increase in the scale of borrowing operations in 1869 and 1870 is reflected, as the theory would expect, in a depreciation in the value of gold in the United States. Borrowing fell off very considerably in 1871 and correspondingly gold appreciated in value in the United States. In 1872 and 1873 loans floated by the United States in Europe increased somewhat in each year, tho not greatly. In 1872 gold depreciated in the United States absolutely but not relatively and in 1873 it appreciated both relatively and absolutely. This last is contrary to the theoretical expectation, tho it is to be said that the increase in borrowing was not great, and the relative appreciation slight, so that the operation of the long-range tendencies making for appreciation may perhaps be presumed to have more than compensated the slight depreciation which would be anticipated from the slightly increased borrowing.

In the period 1867–73 then, our theory on the whole receives confirmation, for not only does the movement in the value of gold in the United States conform in the main to expectation, but in the same period an inverse movement tends to manifest itself in corresponding years in England and Germany.

Consider now the period 1874–78. In 1874 the theoretical expectation of a relative appreciation in the United States following a decline in borrowing is disappointed. There *is* an absolute appreciation, but this absolute appreciation is more than matched in England and Germany. The years 1875 and 1876 show both an absolute appreciation in the United States and an appreciation relative to England and Germany, thus conforming to theoretical anticipation; for these years marked respectively the cessation of borrowing and the beginning of repayment. The same relative situation continues in 1877 as between the United States and England (tho not Germany). This corresponds with repayments of loans on an increasing scale. A high appreciation in all three countries is shown in 1878, tho the movement is not as great in the United States as in the European countries, evidence that the long-range forces, as expected at this date, have once again become predominant.

Summing up, it may fairly be said that throughout the period 1867–78 there is a close correspondence between the fluctuations in the value of gold and the amount of borrowing and of repaying by the United States in the European loan market. The loans were apparently a dominating factor in the exchanges, and through the exchanges in determining the value of gold. A major cycle involving depression in the relative value of gold from 1866 to 1873 in the United States as compared with England and Germany, followed by a rising relative value from 1875 to 1878 corresponds with a period of heavy borrowing from 1866 to 1873 and a succeeding period of dwindling loans and the beginning of repayments from 1874 to 1878. This major cycle is marked by minor fluctuations pretty closely adhering to theoretical expectation, the minor movements in the value of gold in the United States not only corresponding in this way to the demands of theory, but also showing a definite inverse trend to the synchronous movements in England and Germany — strong evidence that the borrowing and lending operations were the cause of the fluctuations.

It should be borne in mind that it is the value of gold in terms of commodities, and not in terms of greenbacks which is shown in column 3 of Table B. Fluctuations in the gold value of the greenback[4] are therefore irrelevant, except for short periods, during which adjustment of greenback commodity prices to the gold value of the money unit is proceeding. These periods of adjustment may indeed be quite adequate to account for such discrepancies as appear between the facts and theoretical expectation, but the discrepancies will then be due not to the change in the gold value of the currency, but to the fact that such a change, tho followed by a corresponding change in commodity prices, nevertheless takes time to work out its effects. Disregarding this tardiness of adjustment in the United States, which so far as it was effective tended to defeat theoretical expectation, columns 3, 6, and 9 present a fair comparison of the value of gold in terms of commodities in the United States, England, and Germany respectively. Gold fluctuated in value in all three countries but it is the relative not the absolute movement which is significant.

---

[4] The total money in circulation in the United States (of which the major part was inconvertible paper) fluctuated but slightly in the period 1865–78. In 1865 total money in the United States (including gold and silver coin, bullion in the Treasury, United States notes and national and other bank notes) was $770,398,000. From that time till 1869 there was a slow decline to $716,471,000, then an upward movement terminating in 1874 at $806,024,000. A new decline then sets in which goes to $763,053,000 in 1877 when the tide turns once again toward recovery (Reports of the Comptroller of the Currency).

Finally it will be noted that when in 1867, after the vicissitudes of the war years had passed, and gold had, so to speak, found its level in the United States, albeit for some years a depressed level, the fluctuations in its value (in terms of commodities) in this country were on the whole no greater than in England, and that its value was more stable in Germany than in either the United States or England. This latter fact constitutes further evidence of the effect on the value of gold of the lending operations, for in these operations Germany played a small part, and the value of gold in Germany was therefore affected but indirectly in the course of Germany's trade with the United States and England; whereas its value in England and the United States was affected by the loans directly and with much greater force.

So much with regard to the test of the first stage in the causal sequence laid down in the theory — the movement in the value of gold consequent upon a disturbance in the equilibrium of the international account through the introduction and withdrawal of large loans. Let us now turn to the effect of these loans, operating presumably through fluctuations in the value of gold, upon the course of international merchandise transactions.

IV. Fluctuations in the Movement of Merchandise

Previous to the Civil War the normal equilibrium had been one in which merchandise exports (including gold and silver coin and bullion) exceeded imports by an average of $20,000,000 yearly. This was the case in the six years previous to June 30, 1860. In the six years following, the average was $24,000,000 yearly the other way. In 1867 the excess of imports mounted to $60,000,000. It would seem that this last effect must be attributed to the loans which were then being placed by the United States in the European market. The $20,000,000 normal excess of exports prior to 1860 would go to pay other items in the international account on which the United States was in those years a debtor. In addition to the falling behind in commodity exports in the six years 1861–66 the earnings of the merchant marine of the United States fell off very greatly. The sale of ships in the war years temporarily sufficed to offset this decline in freight earnings, but the normal excess of $20,000,000 in exports was wiped out by borrowings.

The $60,000,000 excess of imports in 1867, following the depreciation in the value of gold (that is, high gold prices) in the United States in 1866, was succeeded by an excess of *exports* in 1868 of $4,000,000. Reference to page 239 will show an *appreciation* in the value of gold in the United States in 1867 and 1868. It appears that in 1868 the long-range effects of the borrowing of the preceding years were becoming dominant over the immediate effect of new loans: that is to say, the increased supply of goods due to large imports, the money supply meanwhile remaining stationary, was lowering all prices in the United States and thus tending to increase exports; while the diminished supply of goods (due to large exports) and an increased monetary supply (due to imports of gold) were raising prices in Great Britain and tending to decrease exports from that country to this.

In 1869, when borrowing by the United States began on a new and greatly increased scale, the immediate effects of this new borrowing became dominant over the long-range effects of the former loans. Imports in the year ending June 30, 1869 exceeded exports by $94,000,000. The fall which, as we have seen, took place in the value of gold in consequence of these loans would lower the yield on such commodities as were dependent upon the value of gold, that is the exports, and so would tend to restrict them; while the rise in the value of gold in Great Britain would lower the prices of imports from that country and so tend to encourage them. Gold continued to rise in value in Great Britain in 1870 and to fall in the United States, and merchandise imports into the United States for the year ending June 30, 1871 greatly exceeded merchandise exports, tho the export of gold from the United States was large enough almost to effect a balance. This export amounted to nearly $100,000,000 and is easily explained by the relatively high value of gold in Great Britain, or, to put it in another way, its cheapness in the United States.

In the year ending June 30, 1872 merchandise imports into the United States exceeded merchandise exports by about $182,000,000, loans continuing meanwhile to be placed in large volume; and again in 1873 merchandise imports showed an excess over exports of $120,000,000. As has been pointed out, the appreciation in the value of gold in the United States which occurred in 1871 and 1872 was contrary to the expectation of theory. It is interesting to note that the merchandise movement did not follow the vagary in gold. After 1873 the check on borrowing was so stringent as to constitute a relative, and about 1875, an absolute cessation; in the latter year repayments began to outrun new loans. Reference to Table B will show an appreciation in gold in the United States in the years 1873–77. A corresponding cessation of the excess of merchandise imports over exports takes place at the same time. Thus for the year ending June 30, 1874, merchandise exports exceed imports by $19,000,000 and tho in 1875 a slight reversion causes an excess of imports of the same amount, in the years ending June 30, 1876, 1877, 1878, excesses of merchandise exports of $80,000,000, $151,000,000, and $258,000,000 appear, completely reversing conditions in the early seventies. Accompanying this reversal in merchandise account there was a corresponding reversal in financial account, the large loans of the early period changing to large repayments in the later. All this is in accord with our theory. But whether the loans were the cause of the movement of merchandise or the movement of merchandise was the cause of the loans, which in the latter view would be considered to have been floated for the purpose of extinguishing a merchandise debit already created, is yet to be determined.

So far two results have appeared: (1) that the heavy borrowing of the late sixties and early seventies tended to depress the premium on gold in the United States, and the cessation of these loans and their repayment to elevate that premium; and (2) that there was a correspondence between the flotation of loans and the course of international merchandise transactions. It remains to show the relation of cause and effect between (1) and (2); to show how the depression in the premium on gold as a result of the loans acted upon prices in such a way as to stimulate imports into the United States and check exports from the United States, and thus to effect a balance; to show the converse tendency produced by the cessation of borrowing and the repayment of the loans; and how the change in the course of trade, thus brought about, itself affected prices in such a way as to establish a new equilibrium. This involves an investigation of price phenomena, which will be undertaken in the section to follow.

V. PRICES

A. Price Changes in the United States

The precise object of the inquiry on the course of prices will be to see if any significant differences can be traced between the price movements of commodities exported by the United States, commodities imported into the United States, and commodities both produced and consumed in the United States; differences between these three groups being considered with regard to the course of international trade and an adjustment of equilibrium.[5]

Of the 153 available series of wholesale price quotations by quarters from 1860 to 1880 many are for slightly different forms of the same commodity or for closely related commodities; thus there are three series for flaxseed, five for starch, etc. Professor Mitchell has grouped into a single series the prices of all such closely related commodities and has reduced the 153 series to 92. These 92 series have been here divided into the three classes just mentioned: (*a*) export commodities, which comprise all those commodities exported by the United States on a scale sufficient to cause their price to be determined in a foreign market; (*b*) import commodities, which comprise all those commodities the import of which was great enough to be the determining factor in their prices; (*c*) domestic commodities, which comprise all those commodities the production and consumption of which was carried on almost exclusively at home. Some of the commodities for which price quotations are available, could not well be placed in any one of the three categories. Such were lumber and hides, both imported and exported, and for the present purpose neither fish, flesh, nor fowl. They have therefore been omitted. Of the 92 series, 74 were reasonably amenable to our classification. Export commodities constitute 18 series; import commodities, 14 series; domestic commodities, 42 series.

---

[5] Figures for prices in the United States still have been obtained from Professor Mitchell's study. They have been rearranged for the purpose of the present investigation.

Prices in 1860 are taken as the standard (100) because an average for the decade or quinquenniad preceding 1862 was not possible, since the data available in many cases do not run previous to 1860; and it was not desirable to take the year 1861, since it was one of marked business depression. 1860 was a normal year, and therefore the prices of that year are taken as giving the best available standard.[6] All prices are relative to the price for the given commodity in 1860.

Before giving in tabular form the results which come from the regrouping of the price statistics available, let us direct attention once more to the trends that theory would lead us to expect in prices in the United States. They are as follows.

1. Transitional effects.

In Period A, 1866–74 (the period of heavy loans to the United States by Europe).

(1) Low (paper) prices of export commodities.

(2) Gradually falling (paper) prices of import commodities.

(3) Relatively high (paper) prices of domestic commodities.

In Period B, 1874–78 (the period of the cessation of loans floated in Europe by the United States and their partial repayment).

(1) High (paper) prices of export commodities.

---

[6] With regard to commodities subject to seasonal fluctuations in prices the *average* of quarterly quotations for 1860 serves as a base. For the rest the price on January, 1860, is usually taken, tho for various reasons some other month of 1860 might have been selected as more representative.

(2) Gradually rising (paper) prices of import commodities.

(3) Relatively low (paper) prices of domestic commodities.

2. Long-range effects.

Period A. Relatively low prices in the United States, as compared with other countries, for all commodities.

Period B. Relatively high prices in the United States, as compared with other countries, for all commodities.

The transitional price movements of Period A — low paper prices of export commodities, gradually falling paper prices of import commodities and, as compared with export and import, high paper prices of domestic commodities — will in Period B tend to be reversed toward high paper prices of export commodities, gradually rising paper prices for import commodities and, as compared with export and import, low paper prices for domestic commodities.

Owing to the vicissitudes in the commercial and financial situation at this time, the long-range effects can scarcely ever be expected to be dominant. They will be operative, and will tend, as have been shown, to neutralize the transitional effects. But the changes in fundamental conditions which occur here at intervals of a few years only will make the transitional effects conspicuous, the long-range effects not having time to dominate the situation before a new disturbing influence appears.

One word further, in explanation of the theoretical expectation with regard to the prices of export and import commodities. The premium on gold having fallen, the (paper) prices received for export commodities immediately fall, since the price of these commodities is set in gold in a foreign market. This fall in the paper price received for exports will tend, it is true, to diminish supply and so cause an upward movement in their prices thereafter. But the competition from other countries supplying the same market will tend to keep the gold price at its former level and thus the paper price low. So far, however, as foreign competition is not operative, there will be a gradual rise in the gold prices of these commodities to a point where the paper price into which the gold price is translated bears the same relation to the paper prices of other commodities as before the decline in the gold premium. As for imports, they are obtained for the same gold price as before the fall in the gold premium and therefore cost less in paper. Since there is no change in the conditions of demand, they can be sold at the same paper price as formerly and importers will for a time get abnormal gains. Competition will however tend to bring their paper prices down. Thus a depreciation in gold will cause the paper prices of exports to fall immediately, after which they may very gradually tend to rise; while imports on the other hand, unaffected immediately, begin quickly to fall in their paper prices and will fall till their paper prices bear the same relation to the paper prices of other commodities as before the fall in the gold premium. A decline in the gold premium, then, will cause the paper prices of exports to fall below the paper prices of commodities in general, the paper prices of import commodities will follow this decline with a lag, the prices of export commodities meanwhile tending slightly to recover. Conditions are of course just reversed when the premium on gold rises.

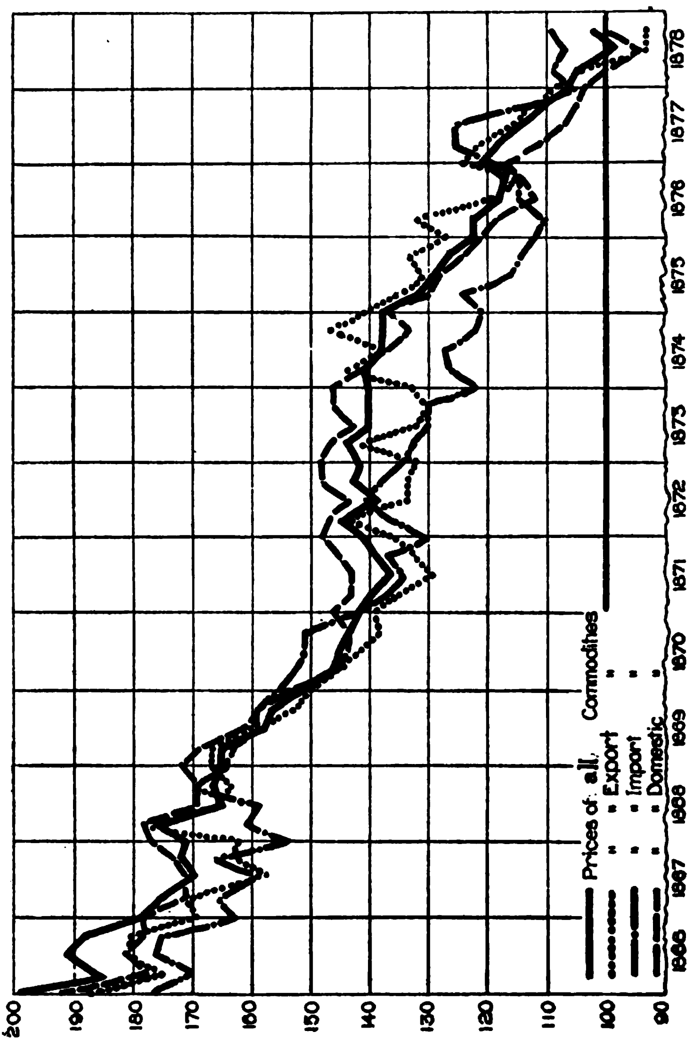
The table and chart which follow present by quarters, for 1866–78, the arithmetic mean of wholesale prices in general (92 commodities); the arithmetic mean of

ARITHMETIC MEANS OF PRICES OF EXPORT, IMPORT, DOMESTIC AND GENERAL COMMODITIES

Date		Arithmetic mean of all commodities (92 articles)	Arithmetic mean of 18 export commodities	Arithmetic mean of 14 import commodities	Arithmetic mean of 42 domestic commodities
1866	January	199[7]	188	177	192
"	April	186[7]	175	170	177
"	July	191[7]	181	176	181
"	October	188[7]	180	175	178
1867	January	179[7]	169	163	178
"	April	175[7]	171	165	171
"	July	170	157	159	171
"	October	172	163	166	173
1868	January	171	162	154	177
"	April	176	178	161	178
"	July	165	165	159	169
"	October	166	163	169	169
1869	January	165	167	164	172
"	April	165	167	163	168
"	July	158[7]	160	159	161
"	October	157	153	159	159
1870	January	152	150	155	153
"	April	146	146	153	145
"	July	145	142	151	143
"	October	143	138	151	143
1871	January	142	139	142	146
"	April	140	136	137	143
"	July	137	129	134	143
"	October	139	132	137	145
1872	January	141	136	130	148
"	April	145	145	136	147
"	July	139	133	140	143
"	October	143	133	138	148
1873	January	142	132	134	148
"	April	144	141	132	147
"	July	140	132	130	143
"	October	140	130	130	146
1874	January	140	133	122	146
"	April	141	144	126	141
"	July	138	138	127	137
"	October	138	146	122	133
1875	January	138	141	121	137
"	April	132	135	124	130
"	July	129	131	116	128
"	October	127	133	114	124
1876	January	122	127	112	121
"	April	122	132	110	118
"	July	118	119	115	112
"	October	117[7]	115	114	114
1877	January	121	124	118	117
"	April	118	121	125	111
"	July	114	115	125	107
"	October	110	112	113	105
1878	January	107	108	105	103
"	April	105	104	109	99
"	July	99	93	107	94
"	October	102	93	109	100

---

[7] In these quarters, chiefly in the years 1866 and 1867, the figures of average general prices for the ninety-two commodities will be found to be higher than the average prices of any of the groups of export, import or domestic commodities; and in one case, July, 1869, they are lower. This is because the three segregated groups together comprise only seventy-four of the ninety-two commodities. The influence of the eighteen omitted commodities accounts for the apparent error. These eighteen commodities, while incapable of being considered domestic commodities pure and simple, are nevertheless of much greater significance in domestic than in foreign trade. If included as domestic commodities they would, in seven of the total of eight cases where the discrepancy occurs, have occasioned changes which would have emphasized the results expected by theory. In one case their inclusion would have had the opposite effect.


200
190
180
170
160
150
140
130
120
110
100
90
1866
1867
1868
1869
1870
1871
1872
1873
1874
1875
1876
1877
1878
Prices of all Commodities
" " Export "
" " Import "
" " Domestic "

wholesale prices of 18 export commodities; the arithmetic mean of wholesale prices of 14 import commodities; and the arithmetic mean of wholesale prices of 42 domestic commodities.

The significant movements shown in these figures are the following:

(1) From the first quarter of 1866 to the first quarter of 1874 (inclusive) the average price of domestic commodities is only twice (October, 1866 and April, 1870, and here the maximum difference is two points) lower than that of export commodities, and from the latter date to the second quarter of 1878 they are never once higher. In three instances, July, 1866, April, 1867, and April, 1868, the average of both types of commodities is the same. The greatest difference between the average prices of the two types is 21 points in October, 1872.

(2) From the first quarter of 1866 to the second quarter of 1876 (inclusive) the average price of domestic commodities is never once lower than the average price of import commodities except for all four quarters of the year 1870; and from the second quarter of 1876 to the concluding quarter of the period studied, 1878, they are never once higher. Note here how the prices of import commodities follow those of export commodities with a lag. The response of import to export movements is not immediate, but a general sympathy is evident. Export commodity prices respond quickly to the changed conditions after 1873, import commodities slowly.

(3) From the first quarter of 1866 till the first quarter of 1874 the average price of *export* commodities is never higher than the average of general prices (all commodities) except in April, 1868, and for the first three quarters of 1869 (the maximum difference in any one of these exceptional cases is two points); and from the second quarter of 1874 till the first quarter of 1878 it

is never lower except in October, 1876, when it falls below the average of general prices by two points.

(4) From the first quarter of 1866 to the second quarter of 1877 the average prices of *import* commodities are never higher than the average of general prices (all commodities) except in October, 1868, July and October, 1869 and all four quarters of 1870; and from the second quarter of 1877 to the end of 1878 they are never lower, except in January of the latter year. Here again the lag in the price movement of imports is evident. The revolution in trade after the panic of 1873 does not work out its full effect on import prices till 1876 or 1877.

(5) From the third quarter of 1867 to the second quarter of 1874 (inclusive) the average price of domestic commodities is never lower than the average of general prices (all commodities) except in April and July, 1870, and is usually four to six points higher. From July, 1874 onward it is never once higher and is usually four to six points lower.

(6) On the curtailment and practical cessation of borrowing by the United States, beginning with 1874, export prices responded almost immediately, shifting permanently in 1874 from a status consistently below the averages of domestic and of general prices to one consistently above it. Import prices responded also, but more slowly, and tho showing an absolute rise in April and July, 1874, while domestic and general prices were falling, and with some checks a relative rise thereafter, it was not until July, 1876 that they became absolutely higher than the prices of domestic commodities, and not until April, 1877 that they became absolutely higher than the average price of all commodities.

(7) While the average prices of export commodities are generally higher absolutely in the first years of large borrowing (the years immediately after the war) than

the average prices of import commodities, yet there is a sharper fall in the prices of exports in these years than in those of imports. In October, 1866, the prices of export and import commodities respectively were 179 and 175, by October, 1867, 163 and 165, and by October, 1868, 163 and 169.

(8) After the panic of 1873 and the cessation of borrowing export prices rise rapidly and then gradually fall, while import prices remain fairly constant with a tendency in 1876 and 1877 to increase.

B. Interpretation of American Prices

All of these results are in correspondence with the theoretical expectation. Loans, as has been pointed out, were severely curtailed by the panic of September, 1873. The complete shift in the relations of export and import prices to those of domestic commodities took place almost immediately, by April, 1874. Previous to that date, during the period of heavy loans floated by the United States in Great Britain, export and import commodity prices, were, consistently with theory, almost without exception lower than domestic commodity prices; after that date and the relative cessation of borrowing, they were, again consistently with theory, almost without exception relatively, and for the most part absolutely, higher. Import prices, both during the period of large borrowing and after its cessation, as theory would expect, responded more slowly than export prices to the changes caused by the introduction of the loans into the international account and by their abstraction from it.

The most striking exception is the year 1870, when import price figures rise above the prices of domestic commodities in all four quarters. It is possible that the

Franco-Prussian War, by setting up a large demand for English exports (i. e., American imports) may account in some measure for this phenomenon.

It will be noted that the April quotations of exports tend to be the highest of the four quarters—a natural result of the fact that the exports were predominantly agricultural products and the April quarter would show an advance in prices over that of any other of the three. On this ground it would be more just to take the yearly average than quarterly prices. If this were done, several of the cases in which fact and theory do not correspond, few as these are, would be removed and a still more ideal correlation would appear.

C. Comparison between Price Movements in the United States and in England

The course of prices in England, so far as they were affected by the movements in exchange on the United States, ought to show a tendency contrary to that which appears in the United States. It is not to be expected that English prices would respond readily to the fluctuations in New York exchange, since Great Britain was on a gold basis and the movements of American exchange would affect only a portion of her total foreign trade. Nevertheless Great Britain's trade with the United States was a considerable fraction of her total foreign commerce. Since exports to, and imports from, the United States would be affected by movements in the rate of exchange, it is to be expected that a price movement would develop in England opposite to that appearing at the same time in the United States, exports and imports contrasting with domestic commodities but in the converse direction.

No such complete quotations of English as of American prices are available. But a series of prices,[8] derived from the Aldrich Report gives quotations for commodities, twelve of which may be classed as domestic, twenty-six as import, and five export. The last group is obviously too narrow for any significant inferences and there have been added to it the prices of fourteen other export commodities derived from a supplement to Soetbeer's Hamburg prices in the Aldrich Report, purporting to be the London prices of the English exports mentioned. Prices are given by years only.

Taking 1873 as the year of the shift, and drawing at that year the line of separation of Period A from Period B, the theory would expect the following:

In Period A (United States borrowing).

Transitional effects.

(1) High Prices of Exports. Exporters to the United States will be able to obtain for a time practically the same paper prices as before the disturbance of equilibrium and these translated into gold, which has depreciated, will yield more than formerly. As competition develops among the exporters these prices will tend to drop.

(2) Rising Prices of Imports. The gold obtained by American sellers for their products when translated into paper yields less than before the depreciation of gold, and unless the British buyers can import from some other country the sellers will gradually be able to raise their prices.

Ultimate effect.

A General Rise in Prices. There will be less goods and an increased amount of money as a result of the shift in the play of international demand consequent upon the change in price levels. This general rise in prices will appear as a relative rise in the prices of domestic commodities, exports and imports already having risen in price.

---

[8] Part I, pp. 248 et seq.

In Period B (United States ceases borrowing).

Transitional effects.

(1) Low Prices of Exports. The paper prices obtained for exports to the United States (the market which sets the price) will, owing to the appreciation of gold, yield less than formerly. These prices will gradually tend to rise as the supply is curtailed owing to the low prices obtainable.

(2) Falling Prices of Imports. Due to competition among sellers in the United States, who as an immediate effect of the appreciation of gold, have on its translation into paper, obtained high prices for their products.

Ultimate effect.

A General Fall in Prices. There will be more goods and less money as a result of the shift in the play of international demand consequent upon the change in price levels. This general fall in prices will appear as a relative fall in the prices of domestic commodities, exports and imports already having fallen.

The arithmetic means of the nineteen export, twenty-six import and twelve domestic commodities, for which English quotations are available, are given on page 261.

The following results may be noted:

In Period A (1866–73).

(1) Export prices exceed in every year both import and domestic commodity prices.

(2) In 1866–70 import prices are higher than domestic commodity prices. In 1871–73, however, they are lower.

(3) From 1866 to 1871 the prices of export commodities fall relatively to both import and domestic commodities.

PRICES IN ENGLAND

Date	Arithmetic average of 19 export commodities	Arithmetic average of 26 import commodities	Arithmetic average of 12 domestic commodities	Sauerbeck's[9] index no. all commodities
1866	124	110	102	106.5
1867	118	106	104	103.9
1868	113	106	103	103.1
1869	114	105	100	101.9
1870	111	103	98	100.3
1871	111	103	104	102.6
1872	126	106	111	112.5
1873	130	103	119	116.6
1874	122	98	110	107.0
1875	116	91	109	100.3
1876	110	90	109	97.5
1877	105	94	107	97.4
1878	100	86	105	91.2

(4) In 1870–73 general prices rise.

In Period B (1874–78).

(1) Export prices fall *relatively* to domestic prices throughout, but are not lower absolutely till 1877.

(2) Import prices are lower than domestic prices throughout the period and show, moreover, a relative fall as compared with the prices of domestic commodities.

(3) General prices fall.

These results are in close consonance with the expectation of the theory. The interpretation of them is:

Period A. (1) The high prices of export commodities are in accordance with the theory as to the immediate effects of borrowing operations, to which export commodities most quickly respond.

(2) Import prices are higher than domestic prices till 1871 when the long-range effects tending to raise all

---

9. Aldrich Report, Part I, p. 255.

prices, cause a relative fall in imports as compared with domestic commodities.

(3) The tendency of export prices throughout the transitional period to drop from the high level which is the immediate effect of the borrowing operations is here clearly shown. Short-range effects again become dominant after 1871 as a result of the great new lending operations inaugurated in 1869 and 1870, and prices of export commodities show once more both an absolute and relative appreciation.

(4) The general rise 1870–73 illustrates further the long-range tendency.

Period B. Results (1), (2), (3) are all in consonance with the expectation of theory. The revolution in international finance which began in 1874 is accompanied here as elsewhere by a revolution in prices strictly corroborative of theory.

The course of the price phenomena in England and in the United States ought to be in opposite directions. The following tabular comparison of the arithmetic average prices in the two countries shows how well the theory is verified.

Period A (1866 to end of 1873)

United States (paper standard)	*Great Britain (gold standard)*
(1) Export commodity prices never above domestic commodity prices except in two quarters, October, 1866, and April, 1870.	(1) Export commodity prices never below domestic commodity prices.
(2) Import commodity prices never above domestic commodity prices except in 1870.[1]	(2) Import commodity prices *are* above domestic commodity prices until 1870 — but not thereafter.[1]
(3) General prices falling.	(3) General prices rising.

[1] Possibly explained as the effect of the Franco-Prussian War.

Period B (1874–81)

United States (paper standard)	*Great Britain (gold standard)*
(1) Export commodity prices rise relatively to domestic commodity prices, and from April, 1874 to April, 1878 the former are never below the latter.	(1) Export commodity prices fall relatively to domestic commodity prices, and after 1877 the former are absolutely lower than the latter.
(2) Import commodity prices rise after 1874 relatively to domestic commodity prices and after October, 1876 are never lower than these latter.	(2) Import commodity prices fall after 1874 relatively to domestic commodity prices and after that date are never higher than these latter.
(3) General prices fall. (This is contrary to theory but is probably due to the rapid appreciation of the paper money owing to the prospect of early redemption in gold.)	(3) General prices fall.

The contrast in the price movements in the United States and England, the movement in both countries being in confirmation of the theory, furnishes corroborative evidence too strong to be accepted as mere coincidence. The price movement in one country at one time might be in correspondence with theory, tho due to quite extraneous causes; but it is not within the bounds of any probability that in different countries there should be an opposite tendency in prices at the same time, that the conditions should be reversed in both countries at the same time, that all the expectations of theory should be confirmed under these conditions, and the theory yet be wide of the mark.

The opposite tendencies of prices in the United States and England in the period studied would hardly have been possible if both countries had been under a gold régime. For gold would then have moved freely, and freely entered the circulation of both countries, and the prices of transportable commodities could not have varied greatly in the two countries as compared with their prices before the gold movement took place.

Moreover, with both countries under a gold régime, when equilibrium had been disturbed and gold had flowed to country A from country B, exports of A would tend to rise in price, owing to the increased stock of gold in A, while imports from B would tend to fall in price, owing to the decreased stock of gold in B; that is, the movement of export and import prices in A (and in B, too) would be divergent. But in the present case the movement of export and import prices has been in the same direction (tho in different degrees), since both exports and imports are paid for in gold and rise or fall in their paper prices with the appreciation or depreciation of gold. The contrast is then, not between exports and imports — their prices move together — but between export and import commodities on the one side and domestic commodities on the other.

With both countries under a gold régime, when exchanges had been disturbed sufficiently to induce a flow of gold from one country to the other, the price level would be changed, no doubt unevenly, but in no such way as to make a classification along lines of export, import, and domestic commodities likely to produce any significant results. The adjustment to equilibrium would be reached by a movement in general prices which would tend to carry *every* price in either country in the same direction.

With one country upon a paper basis the readjustment is effected through the exchanges solely, at least so far as the paper-using country is concerned, since for it, the movement of gold cannot affect prices. And it is effected by a movement of prices which discriminates between classes of commodities. The prices of commodities which enter into international trade are affected first and foremost, and the course of the trade itself is controlled thereby. This direct effect upon the prices of commodities which enter into international trade, with no direct effect upon other commodities, is a more efficient regulator of international trade toward an equilibrium than the irregular and widely distributed movement of prices to be expected with both countries under a gold régime could possibly be, and so a quicker adjustment is likely to be reached in the international trade of a country which is on a paper than in that of one on a gold basis, assuming, of course, that no new disturbing factor enters the situation.

VI. WAGES

One further aspect of the subject remains to be treated. This is the effect of the shifts in prices upon the production of commodities. It is an essential part of the theory that, under the conditions assumed, the movements in prices in the paper-using country tend to divert production from an industry producing a commodity for export to one producing a commodity consumed at home, or *vice versa;* that export industries will become relatively unprosperous when the course of international trade and the movement of the exchanges causes a depreciation in gold, and relatively prosperous when gold appreciates.

Thus in Period A (1866–74) the theory would expect exporting industries to be unprosperous as compared with industries producing commodities for home consumption. A movement of capital and labor out of export industries will set in, while industries producing commodities for domestic consumption will receive accessions of labor and capital. This movement will continue until the expectation of profit is as great in the one type of industry as in the other. So the theory would lead us to expect relatively unprosperous exporting industries in Period A; and in Period B when borrowing had ceased, and gold was, as a consequence, appreciating relatively to the prices of commodities in general, a prosperous status for export industries as compared with industries producing commodities for domestic consumption.

Probably the best test of the relative prosperity of industries lies in the movement of wages. Tho wages move less freely than prices—wages show some measure of retardation — yet where an industry is prosperous the pressure for an increase of wages is almost certain to be effective in raising them. On the other hand, where an industry is unprosperous, the resistance to such pressure will be indefinitely greater and wages either will fall or, if they rise, will rise to a less degree than in the prosperous industries.

It is true that the prosperity or depression of an industry will find its reflection in profits as well as in wages, or perhaps, indeed, earlier in profits than in wages. Nevertheless relative wages are the better material for a test of the comparative prosperity of industries for two reasons. (1) Wages for any given sort of labor are uniform throughout the industry, whereas the profits of the various firms which compose the industry will vary from nothing to all to an indefinitely great amount. Hence "normal" profit for the industry at the given time is practically impossible to determine. (2) There are no statistics of profits at this period which are of any value.

Taking relative wages then, as the best test of the comparative prosperity of industries, statistics of wages have been computed from the series of wage schedules given in Mitchell's *Gold, Wages, and Prices.* Professor Mitchell drew on two sources for these data: (1) the compilation of the Bureau of Labor for the Senate Committee which prepared the Aldrich Report in 1892, and (2) the compilation made between 1880 and 1882 by Mr. Joseph D. Weeks for the Tenth Census. These sources, treated separately by Professor Mitchell, may be made to supplement one another for the present purpose. The Aldrich Report gives wage data in twenty-one industries, but of these, twelve industries are so meagerly represented that Professor Mitchell regards the data as too scanty to promise significant results. From the Aldrich Report statistics the present study takes into consideration only eight industries, omitting, in addition to Professor Mitchell's twelve, that of cotton ginghams, which seemed to offer nothing very different from cotton textiles at large. The Weeks Report covers thirty industries in all, in nine of which there are sufficient data to give significant figures of relative wages. Two of these, cotton textiles and woolen textiles, correspond to industries also covered by the statistics given in the Aldrich Report, the other eight being represented in that report either inadequately or not at all. Of the two wage series which occur in both reports those of the Weeks Report have been preferred since they are based on much more comprehensive data. There are then six industries represented from the Aldrich Report and nine from the Weeks Report, fifteen in all, as follows: Building Trades, Carriages, City Public Works, Cotton Textiles, Furniture, Glass, Illuminating Gas, Metals, Paper, Pottery, Railroads, Sawmills, Stone, Tanneries, and Woolen Textiles.

These industries are divided into two classes:

Class A — Industries producing for the domestic market, including the Building Trades, Carriages, City Public Works, Illuminating Gas, Railroads, Saw-mills, and Stone.

Class B — Industries producing for export, or industries subject to competition from abroad, and therefore having the prices of their products in large degree determined by the value of gold in terms of paper. This group includes Cotton Textiles, Furniture, Glass, Metals, Paper, Pottery, Tanneries, and Woolen Textiles. To this group has been added Farm Labor, for which the wages rates, tho not so full as those of the manufacturing industries here given, are yet of such significance for the present inquiry that they ought to be included.

In forming the tables of the mean wage in each industry, the wages for the several occupations in each industry are averaged, the wage in 1860 in all cases being taken as the base = 100.

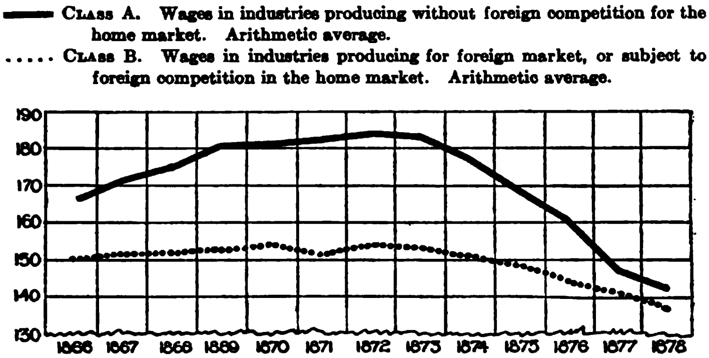
Arithmetic means of wages grouped into the two classes indicated above are:

RELATIVE WAGES[2]

Year	Class A industries (producing commodities consumed at home and not subject to foreign competition)	Class B industries (producing commodities for export or subject to foreign competition)	Year	Class A industries	Class B industries
1866	165	150	1873	182	153
1867	171	151	1874	177	151
1868	174	151	1875	168	148
1869	180	152	1876	160	144
1870	181	154	1877	147	141
1871	182	152	1878	142	137
1872	183	154			

[2] In paper money.

The appended chart shows clearly the difference of movement in the two classes.



—— **Class A.** Wages in industries producing without foreign competition for the home market. Arithmetic average.

..... **Class B.** Wages in industries producing for foreign market, or subject to foreign competition in the home market. Arithmetic average.

We may note: (1) in the period 1866–73 wages are consistently higher in Class A industries than in Class B, and they rise from an average of 165 in 1866 to 183 in 1872, or a maximum spread of 18 points. Wages also rise in Class B industries, but very slightly, the maximum spread being only 4 points from a minimum of 150 in 1866 to a maximum of 154 in 1872. This indicates for this period a high and an increasing degree of prosperity in Class A industries as compared with industries in Class B, and is therefore in conformity with the expectation of theory.

(2) In the period 1874–78 wages fall in both Class A and Class B industries, but the relative decline in Class A is much greater than in Class B; the fall in Class A is from 182 at the end of 1873 to 142 at the end of 1878, or 40 points, while in Class B it is from 153 to 137, or 16 points, indicating a relative prosperity in Class B industries.

Contrasting Class A with Class B industries, the excess in the wage level in Class A industries year by year is as follows:

Year		Year	
1866	15	1873	29
1867	20	1874	26
1868	23	1875	20
1869	28	1876	16
1870	27	1877	6
1871	30	1878	5
1872	29		

The rising prosperity of Class A industries in the period 1866–73 and their declining prosperity in the period 1874–78 is clearly evident.

Turning now to individual industries, the table on page 271 presents the arithmetic mean of wages in each separate industry.

Wages rise highest in Period A in the Illuminating Gas, Saw mill, Stone, City Public Works, and Building industries, while they are lowest in the Farming, Woolen Textiles, and Metal industries. The former industries are all in Class A, the latter all in Class B. Every one of the Class A industries, except Carriages, shows wage levels surpassing that of any industry in Class B, and most of the Class A industry wages are consistently higher than those of Class B by a very considerable amount. In Period B, wages in the Pottery and Glass industries, both of Class B, surpass those of any Class A industry except Illuminating Gas, and wages in the Class B industries, Tanneries, Cotton Textiles, and Furniture surpass those of any Class A industries except Illuminating Gas and Saw mills. Farm labor and Furniture industry wages, however, remain low throughout. On the whole these results offer strong evidence of the relative prosperity in Period A of the industries producing for home consumption and their relative unprosperity in Period B. The theory thus receives further confirmation. The industries most affected by the fall in the gold premium consequent

WAGES

CLASS A. INDUSTRIES PRODUCING WITHOUT FOREIGN COMPETITION FOR THE HOME MARKET

Year	Arithmetic av. class A	Carriages	Saw mills	Building trades	City pub. works	Illuminating gas	Railroads	Stone	Half-year
1866	165	153	165	162	181	183	138	172	Jan.
				171	182	181	148	158	July
1867	171	155	171	174	186	183	155	168	Jan.
				186	188	185	160	162	July
1868	174	156	168	180	186	185	156	178	Jan.
				195	190	186	161	175	July
1869	180	156	167	195	192	195	156	196	Jan.
				199	191	189	162	205	July
1870	181	156	164	192	210	192	165	200	Jan.
				188	202	189	158	201	July
1871	182	158	167	178	213	199	171	188	Jan.
				187	204	195	170	198	July
1872	183	158	171	185	198	196	167	186	Jan.
				190	201	205	171	203	July
1873	182	157	173	180	196	221	158	182	Jan.
				186	195	204	162	198	July
1874	177	151	167	178	199	212	160	182	Jan.
				182	193	200	160	180	July
1875	168	147	160	168	193	200	161	167	Jan.
				170	181	182	158	161	July
1876	160	144	156	160	190	193	150	169	Jan.
				160	166	173	151	141	July
1877	147	139	150	143	150	184	147	140	Jan.
				140	140	165	142	130	July
1878	142	139	147	141	143	169	139	133	Jan.
				137	134	156	138	130	July

CLASS B. INDUSTRIES PRODUCING FOR THE FOREIGN MARKET, OR SUBJECT TO FOREIGN COMPETITION IN THE HOME MARKET

Year	Arithmetic av. class B	Cotton textiles	Farm labor	Furniture	Glass	Paper	Pottery	Tanneries	Woolen textiles	Metals	Half-year
1866	150	149	150	133	152	140	155	162	150	155	Jan.
										157	July
1867	151	155	148	136	151	143	155	158	148	158	Jan.
										159	July
1868	151	151	146	138	151	143	158	158	149	159	Jan.
										159	July
1869	152	152	144	138	152	143	168	158	150	160	Jan.
										160	July
1870	154	155	141	137	160	148	167	163	154	161	Jan.
										159	July
1871	152	159	138	139	161	144	164	157	150	158	Jan.
										159	July
1872	154	161	135	138	161	152	166	158	153	158	Jan.
										161	July
1873	153	164	132	136	160	146	166	161	152	161	Jan.
										163	July
1874	151	159	130	130	158	144	165	161	154	158	Jan.
										159	July
1875	148	157	128	128	157	143	163	158	152	151	Jan.
										148	July
1876	144	150	119	126	155	142	163	150	148	146	Jan.
										141	July
1877	141	146	110	123	154	139	168	146	145	135	Jan.
										133	July
1878	137	143	101	124	150	132	158	146	143	132	Jan.
										131	July

The wage schedules in the Aldrich Report are given semi-annually while those in the Weeks Report are by years only. In the compilation of averages this arrangement has been preserved. For an average of all industries in either group a single yearly figure was obtained by averaging the half-yearly quotations where they occurred, and taking the figure thus obtained as the yearly average wage for that industry.

Statistics for wages of Farm Labor were not available year by year until 1873. Previous to that date scattered statistics only could be secured and these at intervals of several years. It has been assumed that the rise or fall in these wages between one quotation and the next was evenly distributed over the interval between them. This furnishes, of course, a very rough estimate, and the quotations of wages for Farm Labor before 1873 are of but slight value.

upon the large loans placed in Europe in the late sixties and early seventies show by their wage level a relatively adverse position at that time, while in the period when loans ceased and gold as a result appreciated, their relative wage level rises, indicating their prosperity.

VII. SUMMARY

To conclude, the large borrowing operations of the United States inaugurated in the later sixties appeared as an important factor in disturbance of the normal course of trade. The theory here under scrutiny alleges that loans will affect the exchanges, and through them, the gold premium, as the first step in the adjustment process. Hence the movement of the gold premium in the United States was inquired into and contrasted with the value of gold in England and Germany. It appears in the main that the premium on gold in the United States was depressed and elevated according to the expectation of theory. It appears also that an interesting and significant contrast developed between the movement of the value of gold in the United States on the one hand, and in England and Germany on the other; a contrast corroborative of the theory.

The next consideration was that of the movement of trade, and it was found that trade followed the loans, the United States importing largely, pursuant to the placing of loans, and showing an excess of exports when the loans ceased to be floated.

How these trade phenomena were brought about was then tested by an investigation of price movements along the lines suggested by the theory, which was again confirmed by the fluctuations in the prices of export, import and domestic commodities in the manner predicted, the contrast between prices in England and the United States being specially noteworthy.

Further confirmation was given by the results of the inquiry into wages. These were high in those industries which the theory would expect to be prosperous, and low in those which it would expect to find in an adverse situation. On the whole the theory receives substantial verification.

F. D. Graham.

Princeton, N. J.

ENFORCED PAR REMITTANCE UNDER THE FEDERAL RESERVE SYSTEM

SUMMARY

Introductory. The early development of collections, 275. — The effect of the Federal Reserve Act, 276. — The par remittance plan of 1916, 277. — The Hardwick Amendment and its interpretation by the Federal Reserve Board, 281. — The development of opposition, 283. — The outlook for the future, 286.

ANOTHER chapter in check collection is rapidly nearing completion. By its decision of May 16, 1921 in the case of the American Bank and Trust Company versus the Federal Reserve Bank of Atlanta, the Supreme Court has pointed the way to the close of a noteworthy experiment in banking collection systems.

Starting from the vague provisions of the Federal Reserve Act, unchecked by bankers' protests, state laws, or Congressional acts, the Federal Reserve Board since its inauguration in 1914 had almost succeeded in transforming the clearing and collection system of the country. However a group of southern bankers, embittered by what they believed to be domination by the reserve banks, brought the federal reserve collection policies before the courts; resulting in a decision which doubtless will renew the irregularity in the basis of collections. A large share of the responsibility for this failure may be laid to the inclusion of "par collection" in the plan; contemplating an interference with the "sacred right of profit" of country banks. "Par collection" is the obtaining of remittance on checks from a drawee bank at face value. This was proposed as a remedy for the "kiting" of checks as well as a stimulus to their usage.

With the idea of establishing a collection system of this type, the federal reserve banks demanded that every check sent by them to drawee banks be settled for at face value, the customary charge for remittance — "exchange" — being eliminated. However, as a bank's obligation is to pay demand orders on itself only over its own counter the question which the opposition brought before the Supreme Court was: Has a federal reserve bank the legal right to compel par payment of a check in another city?

The collection problem has long been troublesome to all concerned — the customer of a bank wanting par credit on all checks which he deposits, the banker in turn himself desiring the same from correspondents. As there is definitely a cost to be met in handling checks due to the loss of interest while uncollected as well as to expenses incurred in obtaining remittance, someone has to meet the bill. In some cases it has been the banker, in others the customer.

When immediate credit is given on an uncollected check, no exchange being charged, a loan without interest is made by the bank to the customer. In order to offset the cost thus incurred it became customary among banks to open correspondent accounts with each other under arrangements whereby par collection of checks could be obtained in return for the leaving of substantial balances. Since the larger city banks were especially fitted for the handling of such accounts they took over the problem of obtaining remittance on the checks of country banks.

However, in paying checks drawn upon themselves the latter were inclined to deduct a charge varying from one-tenth of one per cent to one-half of one per cent for the service of remitting. City banks were not usually able to claim this source of income, the difficulty being not in any different rights or obligations but that most demand orders came in over their own counter for payment.

By many it was believed that the passing of the Federal Reserve Act late in 1913 would put an end to these irregularities and establish for the country one complete and adequate collection system. For instance, Representative Glass in 1914 stated that the effort to eliminate exchange charges had been resisted "with utmost pertinacity" but that Congress by the act had eliminated the wastefulness incident to many independent collection organizations, and had torn down the "toll gates upon the highway of commerce." [1]

What the act contained was a provision allowing the Federal Reserve Board to form a collection system for member and federal reserve banks; the reserve banks to receive checks at par from member banks and charge them for services rendered in clearing or collecting. Member banks were in turn allowed to charge federal reserve banks an amount at least equal to the costs of collection and remittance of checks sent by the latter.

The Federal Reserve Board was thus given wide powers in prescribing the details of the collection system to be established, being limited only by the fact that checks must be received by reserve banks at par and that a member bank might not be prohibited from "charging its actual expense incurred in collecting and remitting funds." [2] The Board proceeded cautiously however, in order, as stated in the first Report, to gain "the harmonious coöperation of banks involved." [3] After a number of conferences and the consideration of several plans, it was decided to experiment, beginning

---

[1] Report of the American Bankers Association, 1914, p. 117.

[2] Federal Reserve Act as approved December 23, 1913, Section 16.

[3] Federal Reserve Board, Report, 1915, p. 14.

December, 1914 in two districts, St. Louis and Kansas City, with a system of enforced par clearing; the Board having concluded it inexpedient to force an undesired measure upon all member banks at the same time. The experiment under trial made a federal reserve bank a clearing center for its district, immediately charging the account of a bank at par for checks drawn upon it, and crediting it at par for remittances.[4]

Much dissension arose under this system due to its compulsory nature, so that on June 15, 1915 it gave way to a voluntary plan of the same type;[5] the Federal Reserve Board believing that a more favorable attitude would be attained if the pressure of participants alone forced reluctant banks to coöperate. Member banks, however, did not respond with the alacrity that was desired, only 25 per cent having joined in the first month. Consequently the federal reserve banks were in doubt as to the best method of procedure; the majority thought a mandatory system necessary.

A committee of federal reserve agents, formed to consider the subject of collections, came to the conclusion in October, 1915 that the problem was one of reserves rather than of transit facilities, recognizing that little could be done in the establishment of a collection system until the reserves had been transferred to federal reserve banks from reserve agents, thus ending the tangle of reciprocal collection arrangements. In June, 1916, as a result of the findings of the Committee, a plan was adopted, effective July 15, 1916. In general the provisions then outlined are still in effect and form the center of the present controversy.

---

[4] No charge was made by the federal reserve banks for their services.

[5] This was adopted in all districts except Kansas City, where the compulsory system still prevailed.

Perhaps the most important recommendation of the Committee was to begin a system of deferred credit by which checks would become available as reserve at federal reserve banks in accordance with a schedule on which was figured the average time necessary in obtaining collection from a particular locality. The member bank depositing checks would thus wait until the drawee bank had time to receive, examine, and remit before credit would be given on the deposit.[6]

The plan further provided that: (*a*) the sending of checks by member banks to federal reserve banks be voluntary, (*b*) all members be compelled to pay without deduction checks drawn on them sent by the federal reserve bank of their district, (*c*) all members be allowed to deposit such checks as could be collected at par, (*d*) the expense of transmission of funds be borne by federal reserve banks.

The hope that fifteen thousand banks would be included on the collection list was very nearly realized, for 14,656 joined the first month, followed by consistent gains. As there were at this time less than eight thousand members of the federal reserve system, about one-half of those on the "par list" were non-member banks. In influencing the latter to remit at par, use was made of two effective devices: (*a*) presentation by institutions in the locality of the drawee bank, (*b*) tendering of checks for cash payment over the counter of the drawee bank by employees of a reserve bank. Indeed, par remittance by mail was not usually attained through any desire on the part of a non-member bank to secure the advantages coming from affiliation with a unified collection plan. Non-members failed to look upon the curtailment of their exchange profit as "slow education" — the term employed by federal reserve officials.

---

[6] It is worthy of note that at this time the Federal Reserve Board abandoned its par collection plan, in that postage or express was allowed to be deducted from remittances, and in addition a deferred payment obtained by the reserve banks. The subsequent plan may more accurately be described as a par remittance system.

So it was that federal reserve banks employed institutions and individuals as means of forcing par payment. Most important as collection agencies were banks and express companies, altho the services of both were rendered incomplete since they did not have offices in every city or town where a non-par remitting bank was located. However the use of banks had the added advantage of being both inexpensive to the federal reserve bank and serviceable to the agent bank; the latter being able to obtain the usage of the proceeds of checks during the time elapsing between par payment, obtained over the counter of the non-member, and the charging of the draft in settlement against the reserve city account of the agent bank. But the final and supposedly clinching method of pressure was direct presentation by traveling agents hired by a federal reserve bank, payment to be accepted in currency only. The expense involved in such presentation, however, rendered it expedient only when others failed or were impossible of application. The call for cash over the counter of a bank made it exceedingly difficult to keep an adequate amount on hand to meet all the demand obligations that the federal reserve bank might tender, especially if several days elapsed between days of presentation. The earlier method of payment had been by exchange on a reserve city resulting in the keeping of a considerable balance with reserve agents. This balance, however, was not available to meet a current demand for cash. Consequently, an objecting non-member would have to withdraw cash in order to protect itself from embarrassment, thus foregoing interest that would have been received on a reserve city account.

One by one the non-members gave in, preferring to lose the exchange profit which they had previously deducted from remittances rather than suffer the inconvenience and expense caused by direct presentation. As would be expected, the federal reserve system was none too popular among non-member banks; this resentment being voiced in resolutions of bankers' associations, bills presented to Congress, state laws, and newspaper articles as well as injunctions. Member banks were also for the most part only too glad to coöperate in the movement to have the federal reserve collection policies changed, for many of them too were suffering a loss of exchange.

Within four months after the formation of the enforced par remittance program of the Federal Reserve Board, the American Bankers' Association in its 1916 meeting went on record almost unanimously in opposition and formed a committee to urge upon Congress and the Reserve Board the necessity of "reasonable charges." As a result of the protests, Senator Hardwick on May 9, 1917 offered a "rider" to the bill then under consideration in the Senate to amend the Federal Reserve Act, legalizing exchange charges to the amount of one-tenth of one per cent. After considerable discussion, the bill as amended was passed by a scant margin. The Senate and House bills as passed not being identical, a conference committee was appointed to secure uniformity. Before this committee had acted, the House hearing of the Senate's action in adding the Hardwick Amendment, voted at the suggestion of Representative McFadden to instruct its conferees to "agree in substance" with the Hardwick Amendment. While the matter was under consideration in the committee, however, much pressure on the part of credit men's associations, wholesale and retail merchants, city bankers, and federal reserve banks was brought to bear against this amendment. Even President Wilson wrote asking that this section be removed from the bill.

Consequently the committee,[7] despite the instructions to include the Hardwick Amendment in the Conference Bill, amended it to read: "That nothing in this or any other section of the Act shall be construed as prohibiting a member or non-member bank from making reasonable charges, *to be determined and regulated by the Federal Reserve Board,* but in no case to exceed ten cents per $100 or fraction thereof, based upon the total of checks and drafts presented at any one time, for collection or payment of checks and remission therefor by exchange or otherwise; *but no such charges shall be made against the federal reserve banks.*"

This report coming before the Senate met with immediate opposition, Senator Hardwick insisting that the substance of the section had been completely altered. Senator Owen, however, speaking for the committee, claimed that the measure could in no way affect the actions of non-member banks, who were the chief objectors to the passing of the conference bill. The result was that the Senate acted favorably upon the Report and on June 14th it came before the House. There again the committee received severe criticism for adding words to nullify the Hardwick Amendment, agreed upon by both the House and the Senate. The measure was however passed, the President signing it on June 21st.

From that date, the federal reserve banks began, even more extensively, the move to establish a "universal par collection list": one that would include both member and non-member banks. Failing to accept the interpretation of Congress on the Hardwick Amendment, the Board looked upon it as "a mandatory requirement that non-member as well as member banks shall remit absolutely at par,"[8] later stating the reason for this interpretation to be that "the federal reserve banks are affording all member banks certain reciprocal advantages in the collection and clearance of checks and because the federal reserve banks are obligated to receive checks at par, they may properly expect remission on the same basis."[9] Meanwhile the Attorney General had ruled that federal reserve banks might not pay exchange.[1] But, instead of failing to accept checks drawn upon non-member banks known to be in the habit of deducting exchange charges, the federal reserve banks chose to put into effect a policy designed to make them pay remittance letters at par.

---

[7] It is interesting to note that five out of the six members of the Conference Committee had previously gone on record in opposition to exchange charges.

So despite the opinion of the Attorney General and the intent of Congress that the provisions of the Amendment of June 21, 1917 did not apply to state banks not connected with the federal reserve system as members or depositors, the reserve banks set out to make every state an "all par state." Their position is well stated by a committee of federal reserve agents: "The banks and the public need a system that is able to collect all items. The par collection system is not a local or selfish undertaking for the benefit of member banks, but is a national enterprise for the convenience of the public, and the promotion of commerce, and concentrated and persistent efforts will be made to make the par list complete."[2]

The success of these attempts is testified to by the fact that from July, 1917 the number of non-member banks remitting at par underwent a steady increase until in January, 1921 over 91 per cent were on the "par list"; the remainder being small unaffiliated state banks in the South, where the federal reserve banks were only just beginning their "educational process."

---

[8] Federal Reserve Bulletin, 1917, p. 501.

[9] Ibid., p. 662.

[1] See letter of Attorney General, Report of Federal Reserve Board, 1918, p. 76.

[2] Report of Federal Reserve Board, 1918, pp. 75, 76.

But this result was not amicably attained. Bankers' associations were ever willing to condemn the federal reserve action, altho few cared to carry the protest into court. As the reserve banks started their program in the South, opposition took the definite forms of: (*a*) an attempt by legal process to restrain the federal reserve banks from collecting at par, (*b*) the influencing of state legislatures to pass laws upholding exchange charges on remittances, (*c*) the attempt to obtain a change in the national statutes, definitely legalizing exchange, (*d*) the bringing of pressure to bear on the Federal Reserve Board and banks to obtain a reversal of their policy.

The legal battle came as a result of the ill-fated campaign of the Federal Reserve Bank of Atlanta to enforce par remittance. Governor Wellborn of this reserve bank had in December, 1919 set out to put all non-member banks in the Atlanta District on the "par list," a step already accomplished in the majority of the districts. Unfortunately for the reserve bank there was included in his letter to non-members asking for par remittance the statement that he "would very much regret to adopt other methods of collection that would prove embarrassing, annoying, and expensive" to banks not coöperating. In response, a number of banks headed by the American Bank and Trust Company filed a bill in equity in the Fulton County Court of Georgia "denying the right of the Reserve Bank to assume jurisdiction over them and coerce their action."

As relief, an injunction was asked permanently restraining the Federal Reserve Bank from collecting checks drawn on the plaintiffs except "in the usual and ordinary channel of collecting checks through correspondent banks or clearing houses."

The case was removed to the United States District Court for the Northern District of Georgia upon the motion of the defendant, the Federal Reserve Bank of Atlanta, where it was heard on its merits; a restraining order being granted the plaintiffs pending the hearing. At this hearing, it was alleged that the methods which the Federal Reserve Bank of Atlanta intended to put into use were "tyrannical and *ultra vires* the charter of the Reserve Bank" and employed to make the country banks render a valuable service without compensation.

In defense, the Federal Reserve Bank asserted its unqualified right to collect by any method checks backed by sufficient funds; it being the contract of the drawee bank to pay on demand. Since federal reserve banks were by their charter (the Federal Reserve Act) prohibited from making payments to remitting banks for services, the Atlanta Federal Reserve Bank was disabled from collecting through the regular channel of correspondence or clearing as long as a bank insisted on deducting the cost of remittance. Thus they maintained that they were forced to adopt other methods of obtaining collection.

The result was that on April 3, 1920, the United States District Court for the Northern District of Georgia affirmed the right of the Federal Reserve Bank to obtain collection by agents. This decision was affirmed by the United States Circuit Court of Appeals, Fifth Circuit, to which it was appealed. When, however, the matter came before the Supreme Court of the United States the decrees of the lower courts were reversed; the higher court holding that if the plaintiffs could establish the purpose of the Reserve Bank to be to break down the business of the former as now conducted, a permanent restraining order should be granted. On this question of fact the case is now in the Northern District Court of Georgia where doubtless the plaintiffs will be successful, as they have the written statement of the Governor of the Federal Reserve Bank of Atlanta that failure to co-operate with the federal reserve system would cause annoyance, embarrassment and expense.

Destined probably to less success than litigation is the effort to obtain effective authorization of exchange charges by state legislatures. The difficulty is not that state legislatures are unwilling to pass bills to secure this end, but that the laws enacted are either discriminatory as between persons, or attempt to make checks legal tender for some purposes, resulting in unconstitutionality. Within thirteen months, laws for the purpose of allowing exchange charges went into effect in eight states: Mississippi, Louisiana, South Dakota, Georgia, Alabama, North Carolina, Tennessee, and Florida. A test case is now before the Superior Court of Union County, North Carolina, where a decision will be handed down on the constitutionality of the North Carolina law. Altho any verdict on the Georgia case will not settle the point at issue in the North Carolina dispute, it will doubtless be true that if a final judgment is given on the former favorable to the non-member bankers, proceedings will stop in North Carolina.

Foremost among those urging the continuation of exchange charges is the National and State Bankers' Protective Association, formed in February, 1920 to unify the action of those opposing par remittance. Largely through their efforts the exchange laws of the various states were passed and pressure brought to bear upon Congress and the Federal Reserve Board. Congress, however, failed to act favorably upon the bills and resolutions presented to it, and the Federal Reserve Board took the matter none too seriously; Governor Harding of the Board stating that "a diversion of this sort is entertaining in a way, because it diverts our mind from the serious problems that are ahead of us." [3] The Association nevertheless succeeded in bringing the issues clearly into view for the first time.

Today the dream of universal par remittance is fading. The peak of the "par list" was reached the first of last year, and the number is slowly being diminished as banks take advantage of rights granted them under injunctions. Not yet, however, has the struggle been terminated. Both sides await the decision of the Supreme Court on the question of fact in the Georgia case. Altho it has indicated a stand in favor of non-member banks, this is not conceded by federal reserve officials. However, if the non-member banks gain a favorable decision it is probable that member banks will be accorded the same rights through an amendment of the Federal Reserve Act, since the Board has pledged itself to equality on this question. The close of the contest has not been reached but the way is indicated toward a return to the irregularities of the collection system of ten years past.

If, then, the federal reserve collection policies are about to be terminated, there seems no substitute plan adequate to the need. Congress cannot greatly help for its mandates can apply only to member banks, outnumbered two to one by non-member institutions. So the prospect of a unified collection system seems even as dark as in the days when the Owen-Glass Bill was in the period of formation. There are, however, possibilities in the present situation. If the Federal Reserve Board is able and willing to modify its collection program to act in the capacity of a unified agency, collecting under an arrangement agreeable to most banks, much benefit will inure to banks and to commerce.

---

[3] Hearing on H. Res. 476, Rules Committee, 66 Cong., p. 56.

Such a plan might provide that: (*a*) it be entered into by all member or non-member banks desiring affiliation; (*b*) each bank be permitted to deduct an agreed per cent (i. e., one-eighth of one per cent) from all remittance letters for exchange, nothing to be allowed as at present for postage or express on remittances;[4] (*c*) federal reserve banks accept checks on deposit in either of two ways: (1) for credit to the amount of the face of the check, this to be deferred for the average period necessary to secure remittance, (2) for immediate credit, exchange to be charged based on the amount of the check and the number of days necessary for collection; (*d*) the federal reserve banks assess a service charge against each bank collecting through the system, based upon the total of checks sent each month to the reserve banks, covering costs incurred in collection, including adequate compensation for the services of the reserve banks.

The more obvious advantages of this arrangement lie in the decreasing through quick collection of the large uncollected funds accounts — the float — and in the forming of centers where checks may be discounted for immediate credit. Equally important, however, is the bringing together of member and non-member banks on a coöperative rather than a compulsory basis of "slow education." Admittedly much dissension would follow the adoption of this plan — especially after the recent coercion — but it would in all probability secure the support of the American Bankers' Associasion, giving it a fair chance of success.

---

[4] It might well be urged that if a uniform rate were fixed, applicable to all banks, injustice would be worked on those at a distance from a reserve city. Perhaps a service charge varying with the location of a bank would be the remedy. For other suggestions see letter of the Committee of Five of the American Bankers Assn. to the Federal Reserve Board, March 12, 1918.

The greatest difficulty, however, lies in the matter of reserves, for state and federal laws offer a variety of reserve requirements, serving to render difficult a sound collection basis. State banks hesitate to forego the interest and low exchange charges as well as credit on the legal reserve received from an account in a reserve city, and the banks holding such accounts regret the possible loss of a profitable connection. One escape from this lack of uniformity is for state banks to join the federal reserve system. Over 20 per cent of those eligible for charters have already taken this step. However, largely because of the severity of membership requirements, only one-quarter of the non-member banks of the country are eligible. If the largest obstacle to an increasing membership — the capitalization required — is lowered, the country will have no less sound banking.

A large share of the solution of the exchange problem, however, lies in the hands of the individual banker and the public. If both would recognize that a check drawn upon another city is not worth par, but is a loan until collection is obtained by the one advancing funds, much light would be thrown upon the collection problem. In the South and West especially it has been customary to deduct exchange largely from remittances and accept deposits of checks at par; the opposite being more nearly true of the other banks of the country. Banks aim to break even at least on exchange. In whatever form it be paid, whether by deduction from remittances, payment upon deposit, or by compensating balances, the charge still remains. Assuredly, the amount of the charge should be made the subject of a comprehensive regulation, but this does not deny its justice.

Indeed both bankers and the public join in the benefits which would accrue from a unified collection system. Such a system may be obtained, if at all, by the coöperative effort of bankers under a plan which would not compel the performance of the remittance service at a loss, as did the par remittance program.

COLSTON E. WARNE.

UNIVERSITY OF PITTSBURGH.

THE RENT OF MINERAL LANDS

SUMMARY

I. Present disagreement on analysis of mine royalties, 290. — Ricardo's analysis, 291. — Modern writers: Taussig, Marshall, 292. — Limitation of Ricardian theory to settled countries and established industries, 293. — Rent of mineral land and agricultural land distinguished, 294. — Analysis of royalties in practice, 296. — II. Proof of the theory. Differences in royalties due to quality of coal, 297; to date of lease, location, fertility of mines, 299. — Relation of thickness to value of seam, 300. — The no-rent mine, 301. — Mine royalties in France, England, the United States, 302. — Graphic representation, 308. — Extensive and intensive margins; diminishing returns, 311. — III. Nationalization. Possible division of royalties if mines are purchased; if confiscated, 312. — Possible results under government operation, under lease to private operators, under free mining, 313. — Effect of nationalization on price of coal; on wages, 314. — Conclusion, 317.

I

SINCE the days of Ricardo most economists have contented themselves with a discussion of the doctrine of rent only as it applies to agricultural land or urban land. If mineral or forest land has been mentioned, it has usually been dismissed with a brief paragraph or two based largely on generalizations and not on facts. So unsatisfactory has the treatment been that today — after a hundred and twenty-five years of discussion of the rent theory — there is no generally accepted analysis of the return on mines. Many modern economists and writers do not mention the subject; those who do, are not agreed in their statement of the theory. One group, represented by Professor Taussig, maintains that mine royalties are closely analogous to the rent of agricultural land. Another group, including chiefly the mineral owners of England, maintains that they are not rent at all but a consideration for the mineral removed from the deposit. Still another group, represented by Professor Marshall, maintains that mine royalties are both rent and compensation for the mineral.

Ricardo did not hestitate to extend his doctrine of rent to all classes of land, yet he understood the modifications that must be made before it could be applied to mineral lands. His two chapters on rent in the *Principles* should be studied together. In Chapter II he stated that "the compensation given for the mine or quarry is paid for the value of the coal or stone which can be removed from them and has no connection with the original and indestructible powers." [1] Yet in Chapter III he said that "there are mines of various qualities, affording very different results, with equal quantities of labor. . . . The return for capital from the poorest mine paying no rent, would regulate the rent of all the other productive mines. This mine is supposed to yield the usual profits of stock. All that the other mines produce more than this, will necessarily be paid to the owners for rent." [2]

The apparent inconsistency may be easily explained. In Chapter III, which is entitled "The Rent of Mines," Ricardo was concerned only with the return on mines due to their original and indestructible qualities. He was assuming (tho he failed to make clear the assumption) that the compensation paid for the mineral removed, mentioned in Chapter II, had already been deducted. Ricardo undoubtedly believed that mine royalties had a dual character — that they were partly a payment for minerals removed and partly a differen-

[1] Ricardo, Principles of Political Economy (Gonner edition), p. 45.

[2] Ibid., p. 62.

tial return due to the superior location or the greater fertility of particular mines.

Professor Taussig is of the opinion that the rent of mines, particularly in old countries, is closely analogous to the rent of agricultural land and follows the same economic laws. He doubts whether any surplus exists in new countries or in the mining of those minerals for which the risks of prospecting and exploitation are so great that the large profits on a few mines no more than offset the losses on the others. Mining for gold or copper is particularly risky. He remarks: "Where royalties are paid in well explored countries on minerals whose qualities and value are reasonably well known, they are simply rent. Such seems to be the case with royalties on English coal mines." [3] But Professor Taussig does not agree with Ricardo's contention that a part of the royalty is compensation for the mineral removed. "The fact that a store is physically limited does not enable its owner to secure a price. Sand and clay are thus limited; but the available quantity is so abundant that a clay pit or sand deposit is worth nothing unless it has an advantage of situation. It may be doubted whether any payment at all, royalty or what not, can be secured by the owner of the poorest mine, assuming he has done nothing to develop it. Deposits of this sort are at the margin of utilization and at the margin there is no surplus of any sort. . . . Rent proper shows the same sort of development on mines as on other natural agents." [4]

Professor Marshall takes the same position as did Ricardo. He believes that mine royalties are both compensation for the mineral removed and economic rent. "A royalty is not a rent, tho often so called. For, except when mines, quarries, etc., are practically inexhaustible, the excess of their income over their direct outgoings has to be regarded, in part at least, as the price got by the sale of stored up goods — stored up by nature indeed, but now treated as private property."[5]

---

[3] F. W. Taussig, Principles of Economics, vol. ii, p. 96.

[4] Ibid.

I agree with Professor Taussig that there is probably no surplus from mines in new lands. The large profits no more than offset the risks and dangers of exploration and the many losses that occur. It is a generally accepted belief that the total expended in the search for gold far exceeds the product from gold mining. But this sort of situation is not peculiar to mines. The same statement is probably equally true of agricultural land in a newly settled country. During the last century millions of acres of land were given away by the United States government in Nebraska, Kansas, and other middle western and western states, or the land was sold at a few cents an acre. During the lifetime of the original settlers that land sold for $50 an acre or even more. But how much of that increase in value was surplus or unearned increment and how much of it was necessary to compensate the homesteaders for the risks and dangers of pioneering? How much of it was necessary to offset the losses in regions where the increase in land values did not occur? It is estimated that in one period of drought a quarter of a million of people were driven out of western Kansas alone.

The Ricardian rule of rent cannot be applied without qualifications to either agricultural or mineral land in a new country. In its unqualified form it fits conditions in a settled country such as England and in formulating the doctrine Ricardo had the farm lands of England in mind. After the simple statement of the rule is understood it may then be extended to other lands where the land question is more complicated than in England. To get a similar statement of the theory as applied to mineral land we will do well to first examine the nature of mine royalties in a long-established country such as England and in a long-established mineral industry such as coal mining. In a country that has been well explored and prospected by geologists little uncertainty remains regarding the extent and nature of the mineral deposits — particularly those of greatest economic importance, namely coal and iron. Even in the United States, a comparatively new country, the government has about completed the mapping and valuation of the coal lands of the public domain. In order to avoid unnecessary complications in making a typical statement of the theory I shall confine my discussion largely to the coal mines of England.

---

[5] Marshall, Principles of Economics, p. 438.

I am inclined to accept Ricardo's analysis of mine royalties. They are made up of two elements governed by entirely different economic laws. First there is a part representing "the diminution in value of the mine regarded as a source of wealth in the future which is caused by taking the ton out of nature's storehouse," as Professor Marshall expresses it. It is not rent. It is a consideration for the sale outright of the mineral removed just as tho the owner of a large farm had sold a cottage site. It is principal, not income. Then there is another part of the payment that arises because of the superiority of a given mine over the marginal mine. It is income. It is rent in the strict economic sense and is governed by the Ricardian doctrine.

That mine royalties are of the nature of economic rent is recognized by Professor Taussig, but he does not believe that any payment is made for the mineral removed. Mine royalties in his view are analogous to the rent of agricultural land. But obviously there is a difference. The owner of a farm expects his land to be returned at the expiration of the lease in as good condition as when first rented. There should be no deterioration in fertility. Careful farming may even improve the land and a wise farmer will prefer to allow his land to be worked, under best farming methods, rent free rather than allow it to lie idle. The situation is not the same for mineral land. Its yield is drawn from a store that cannot be replenished. The coal removed from the seam cannot be replaced either for this generation or for a later one. Every ton extracted decreases the stored up treasure by that much and the deposit is certainly less valuable than before the coal was removed. The mine that has been worked cannot be returned to the owner unchanged at the end of the lease.

It is true that there are coal deposits so situated or with seams lying at such great depths that no one will pay a royalty on them. Perhaps they can be worked profitably if no royalty is paid, and the owner may work them himself, but he will not permit anyone else to work them without some compensation. He gains nothing; he loses an asset that may bring in an income for himself or his heirs with a change in market conditions. Not only would there be the exhaustion of a store that might some day prove valuable, but the opening of a mine does not improve what the Scotch call the amenities of the neighborhood. The owner of the surface may be compensated for the damage done to that surface through subsidence, but there can be no compensation for the marring of the beauty of the locality with an ugly mine mouth, a black coal tipple, or a dump heap. As a witness before the British Coal Industries Commission aptly expressed it: "A colliery chimney is not an attraction to an estate; it may be as tall as Nelson's Monument, but it behaves somewhat differently."[6]

---

[6] Coal Industries Commission Report (1919), vol. i, p. 315.

Not only may the surface be damaged by subsidence but the construction of a network of underground workings may result in such a lowering of the water table that the land will yield much less in grass or grain. The owner of the coal land will surely demand payment for the coal removed if he permits the deposit to be worked. That payment has been called the minimum royalty, but I prefer to call it the marginal royalty since the term minimum royalty is also applied to the fixed rent per acre that is sometimes paid on coal land. The mine commanding only the marginal royalty is the marginal mine.

The dual character of mine royalties is recognized in practice by mine operators. The late Dr. Rossiter W. Raymond, a distinguished American mining engineer, then secretary of the American Institute of Mining Engineers, summarized the American position as follows in his testimony before the British Royal Commission on Mining Royalties appointed in 1889: "With us the royalty always settles itself according to special advantages. The lowest royalty is the royalty that must be paid, or else the landowner would not care to let the mine be worked. On top of that, you have all those higher royalties coming in to represent special natural advantages."[7] Before a more recent British coal commission, Mr. T. H. Bailey, a mining engineer of Birmingham, stated that "strictly speaking, royalties are partly rent or income, and partly capitalization of assets."[8]

True, a group of writers made up largely of British mineral land owners and their representatives maintains that a royalty is a payment for the mineral removed and nothing more. They do not agree with Ricardo, or Marshall, or Taussig in the application of the Ricardian rent doctrine. They fail to take into consideration the "special natural advantages" mentioned by Dr. Raymond. They state, for example, that "in all cases the colliery proprietor (if not himself the owner of the coal) pays a royalty, i. e., a purchase price for unsevered coal," [9] or that "a royalty is payment of purchase of coal," [1] or again that "this royalty, or sum, is often referred to as rent, but is in fact a payment out and out for the coal worked which disappears from the mine." [2] Such a position is difficult to defend. If mine royalties are solely a payment for the mineral obtained from the mines how can the differences in the royalties paid on mines in the same neighborhood — even situated side by side — producing coal of exactly the same quality be accounted for? or the fact that mines in different parts of the country command different royalties? Only by the Ricardian doctrine can these differences be explained.

---

[7] Third Report, Royal Commission on Mining Royalties, British Sessional Papers, 1890–91, vol. xli, p. 10.

[8] British Coal Industries Commission Report (1919), vol. ii, p. 691.

II

Mine royalties may differ because of a difference in the quality of the coal. In the United States royalties as high as 50 cents per ton are paid on anthracite coal and 10 cents or less on some grades of bituminous. But this difference does not necessarily represent any surplus. It may be due to a difference in the marginal royalty. The two grades of coal have different values. They bring different prices in the market. The owner of the anthracite deposit will demand a higher marginal royalty than the owner of the bituminous deposit since a more valuable product is being taken from his land. A true surplus arises only when a given amount of labor and capital is able to obtain a greater tonnage of coal in one mine than in the other. Accordingly in making comparisons I shall assume that the coal or mineral obtained from the mines compared is of the same quality and that the mines are in direct competition.

---

[9] British Coal Industries Commission Report (1919), vol. i, p. 300; testimony of Henry Louis, Professor of Mining, University of Durham.

[1] Ibid.

[2] Ibid., p. 312, testimony of R. F. Pawsey, secretary of Mineral Owners Association of Great Britain.

Mine royalties may differ because leases have been made at different times. In a lease made in a boom year a higher royalty may be exacted than in a lease made in a year of general industrial depression. I therefore assume that the leases on the mines compared have been made at the same time and under identical conditions.

Mine royalties may differ because of what Ricardo called the original and indestructible powers of the land — what Professor Ely calls the inseparable conditions of the land. These powers or conditions are both extrinsic and intrinsic. The extrinsic powers include transportation and market; the intrinsic, thickness of seam, depth, angle of seam, faulting, nature of roof, and the like. "The workability of any coal will ultimately be determined by two offsetting factors — (1) its character and heat-giving quality, whence comes its value, and (2) its accessibility, quantity, thickness, depth, value, and other conditions that affect the cost of its extraction."[3]

One of the indestructible powers of all land, mineral or agricultural, is location. As with agricultural land, the location of a mine near a market will cause it to yield a surplus over a mine less favorably located and subject to high transportation charges. Mines located near industrial or shipping centers command higher royalties than those more distantly located. In the islands north of Alaska there are large deposits of coal but they are so far removed from market that not only do they pay no royalties but they are still untouched by the hand of man. In West Virginia within 200 miles of Fairmont there are large areas of coal land, owned by the Baltimore and Ohio Railroad, situated so far from a railroad that they are still undeveloped. The United States Geological Survey in its classification and valuation of government coal lands places on lands more than 15 miles from a completed railroad a value one-half of the amount which would be fixed if they were less than 15 miles from a railroad.[4]

---

[3] Bulletin 537, "The Classification of Public Lands," U. S. Geological Survey (1913), p. 67.

Two mines situated side by side and producing the same grade of coal may command different royalties because of differences in intrinsic factors. Their seams may lie at different depths or angles. The seams of one may be thicker or contain less slate than the seams of the other, or they may be less faulted or broken. The material of the roof of one mine may be stronger making necessary less timbering. To describe all these points of superiority that one mine may have over another a term ordinarily applied to agricultural land may be used: one mine is more *fertile* than the other. Because of its greater fertility a smaller quantity of labor and capital is required to extract a ton of coal. The owner of the more fertile mine can demand a higher royalty than the owner of the less fertile mine just as the owner of the more fertile farm demands a higher rent than the owner of the less fertile farm. In Kentucky the usual royalty on coal from seams 3 to 4 feet thick is 8 cents per ton, from seams 4 to 5 feet thick, 10 cents, and from seams 5 to 6 feet thick, 12 cents.[5] The difference in royalty is a surplus and is economic rent. Before the British Commission on Mine Royalties already cited Sir Lowthian Bell, President of the Cleveland Mine Owners' Association, stated that: "The royalty dues paid in Cleveland for ironstone are about 6 pence per ton. In Lincolnshire or Northamptonshire they are sometimes double this sum because instead of expensive shafts and machinery being required, the mineral lies near the surface with a covering of greater or less thickness of sand or rock."[6]

---

[4] Bulletin 424, U. S. Geological Survey (1910), p. 41.

TABLE I[7]

Thickness of bed in feet	Average cost		Approximate combination cost	Value by inversion
	Anthracite	Bituminous		
1	2	3	4	5
10	1.00	1.00	1.00	1.00
9	1.01	1.03	1.02	.97
8	1.045	1.075	1.05	.95
7	1.10	1.126	1.10	.91
6	1.18	1.20	1.20	.83
5	1.35	1.30	1.33	.75
4	1.65	1.45–1.55	1.50	.66
3	2.13	2.00	2.00	.50
2	3.36	3.00	3.00	.33

Table I is an adaptation of a table published by the United States Geological Survey showing the relation of thickness to the value of a bed of coal. It is used by the Survey in determining the value of coal beds under government land. In the first column is given the thickness of the seams in feet, ranging from 2 feet to 10 feet. A seam with a thickness of 10 feet is taken as a standard and in columns 2 and 3 the cost of working such a seam is unity or 1.00. The costs of working the thinner seams is expressed in terms of the cost of the thicker seam. A seam of anthracite 2 feet thick costs 3.36 times as much to work as a seam 10 feet thick. Column 4 is an approximate combination of the average cost of working anthracite and bituminous coal. Column 5 shows the relative value of the seams and is obtained by inverting the cost of extraction, or in other words by dividing 1.00 by the figures in column 4. A seam 5 feet thick has a value 75 per cent of the value of a seam 10 feet thick, and a seam 2 feet thick is valued at only 33 per cent of the value of the 10-foot seam.

---

[5] Bulletin 424, U. S. Geological Survey (1910), p. 10.

[6] First Report, Royal Commission on Mining Royalties, British Sessional Papers, 1890, vol. xxxvi, p. 149.

[7] Adapted from table, U. S. Geological Survey, Bulletin 537 (1913), p. 84.

The Ricardian theory of rent involves the concept of no-rent land, or land that produces only enough to pay the costs of production. Similarly there must be a no-rent mine or a marginal mine. Economists have been misled in their efforts to find that no-rent mine. They have perceived that all mines, even the poorest, yield some royalty, but they have not understood that the royalty on the poorest mine is not economic rent but compensation for the mineral removed. The mines paying such royalty are the no-rent mines. They are the marginal mines.

England's position as a manufacturing and commercial nation may be said to rest upon a foundation of coal and iron, and the English have always shown a keen interest in their deposits of those two important minerals, especially since Jevons in his book on *The Coal Question* pointed out that the deposits were not inexhaustible. Some thirty years ago a royal commission was appointed to investigate the effect of royalties upon the mining industry. In their voluminous report are many bits of evidence that prove the correctness of the present analysis of mine royalties. In more recent years other commissions have been appointed to study various coal problems, notably the Coal Industries Commission of 1919. Tho the later commissions have given some attention to the nature of mine royalties they have brought to light very little information not already published by the earlier commission.

The investigation of the Royalty Commission of 1889–93 was not limited to the English mining industry, it included a study of the mining laws of the leading mining countries of the world. One of the laws reported on was the important French mining law of 1810 which provides, among other things, for a proportional royalty to be paid by the mine operators to the owners of the surface. Table II shows the usual royalties paid at the time of the investigation (1890) in the basin of the Loire.

TABLE II.[8] — MINE ROYALTIES IN BASIN OF LOIRE (1890)

Depth of seam	Thickness of seam			
	A	B	C	D
	2 meters and over	1 to 2 meters	½ to 1 meter	Less than ½ meter
I. In pits 50 meters deep	1/6 of y'd	1/9 of y'd	1/12 of y'd	1/24 of y'd
II. " " 50 to 100 m. deep	1/8 "	1/12 "	1/16 "	1/32 "
III. " " 100 " 150 " "	1/10 "	1/15 "	1/20 "	1/40 "
IV. " " 150 " 200 " "	1/12 "	1/18 "	1/24 "	1/48 "
V. " " 200 " 250 " "	1/14 "	1/21 "	1/28 "	1/56 "
VI. " " 250 " 300 " "	1/16 "	1/24 "	1/32 "	1/64 "
VII. " " beyond 300 " "	1/20 "	1/30 "	1/40 "	1/80 "

The French law recognizes that mines differ in fertility and establishes a differential based upon both thickness and depth of seam. The marginal mine is the mine with the deepest and thinnest seams that can be worked at the market price for coal. If the demand for coal is such that mines more than 275 meters deep or with seams less than ¾ meters thick cannot be worked profitably, the mines at those limits are the marginal mines and the marginal royalty is $\frac{1}{32}$ of the yield as shown by Group VI, column C of the table. A mine 75 meters deep and with seams 2½ meters thick would command a royalty of ⅛ of the yield. The marginal royalty would be $\frac{1}{32}$ of the yield, the remainder — ⅛ minus $\frac{1}{32}$ or $\frac{3}{32}$ of the yield — would be economic rent. The French law of 1810 may not express the true differential between the various grades of mines but it does recognize that such a differential exists and that even the poorest mine worked pays some royalty. The marginal royalty, provided for under the French law, must not be confused with payment for damage to the surface which is covered by an entirely different provision.

---

[8] Adapted from Final Report, Royal Commission on Mining Royalties, British Sessional Papers, 1893, vol. xli, p. 64.

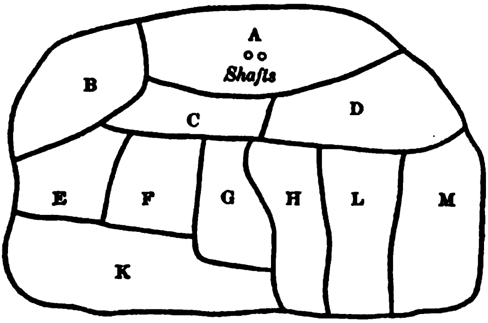


FIGURE 1. Area represented = 2000–3000 acres.

Figure 1 is a diagram of the various small holdings in a coal field attached to a large colliery in Durham, England. Each of the plots has a different owner; all are leased to the operator of the colliery. The shafts for the field are located in plot A and all the coal leaves the ground there. Wayleave charges and easement rents must be paid to the owners of the plots through which coal is carried on its way to the shaft and a shaft rent must also be paid to the owner of A. In other words the plots at a distance from A are at a disadvantage and their costs of production are greater than those of A. Plot A should therefore command the highest royalty, the differential being economic rent. Table III shows the royalties, easement rents, etc., paid by the various holdings in 1889.

Table III.[9] — Royalties, Easement Rents, etc., paid in 1889 in Coal Field shown in Figure 1

Royalties reference letter	Royalty tonnage rent on coals worked	Other royalty proprietors charging easement rents	Easement[1] rents per ton	Total of mine and easement rent per ton	Date of leases
	pence		pence	pence	
B	4.22	– A	1.85	6.07	1849
C	4.25	– A	1.85	6.10	1856
D	5.33	HCA	2.55	7.88	1864
E	4.29	CA	1.94	6.23	1853
F	3.61	GHCA	3.17	6.78	1843
G	3.79	HCA	2.55	6.34	1880
H	3.75	CA	1.95	5.70	1873
K	3.82	GHCA	2.86	6.68	1865
L	4.00	DHCA	3.04	7.04	1886
M	4.00	DHCA	3.04	7.04	1878
Av. exclusive of A	4.11		2.48	6.59	
A	5.00			5.00	1847

It will be noted that the highest royalty per ton is paid on holding D — not on holding A — tho D must also pay easement charges to the owners of H, C, and A. This apparent contradiction of the rent theory may be accounted for by the fact that the leases for A and D were not made under identical conditions but in different years — A in 1847 and D in 1864. It will also be noted in the fifth column of the table that after the easement and other charges have been added to the royalties the total charge per ton for all holdings is practically the same. Inconsistencies are probably due to the making of the leases in different years.

---

[9] First Report, Royal Commission on Mining Royalties, British Sessional Papers, 1890, vol. xxxvi, pp. 32, 146.

[1] An easement rent is a sum paid for moving coal across another's land.

In the diagram Mine K appears to have the least favored situation as it is located farthest from A and coal must cross G, H, C, and A to reach the shaft. The table shows that K receives a royalty lower than the royalty of any other holding except F, G, and H. The mine galleries have apparently been so constructed that coal from F and G must follow almost the same route as coal from K and must pay the same charges. Neither the diagram nor the table gives any explanation for the low royalty of plot H. Perhaps it can be accounted for by the panic of 1873, the date of the lease, or perhaps in this holding the operator has secured most of the economic rent for himself. Holdings A, B, C, D, E, L, and M, bring to their owners a surplus above the returns on the marginal mine, or economic rent.

Figure 2 is a diagram of another colliery with holdings in Durham. Holding A, in which the shaft for the field is sunk has the most advantageous position. Holdings C and E are the marginal holdings for the field and pay the lowest royalties. As shown in Table IV the marginal royalty for the field is 3 pence. Holdings A, B, and D yield an economic rent.

TABLE IV.[2] — ROYALTIES PAID ON HOLDINGS IN DURHAM COAL FIELDS

Plot A — 6 pence per ton
" B — 4 " " "
" C — 3 " " "
" D — 4 " " "
" E — 3.3 " " "

---

[2] Second Report, Royal Commission on Mining Royalties, British Sessional Papers, 1890-91, vol. xli. Appendix XX.

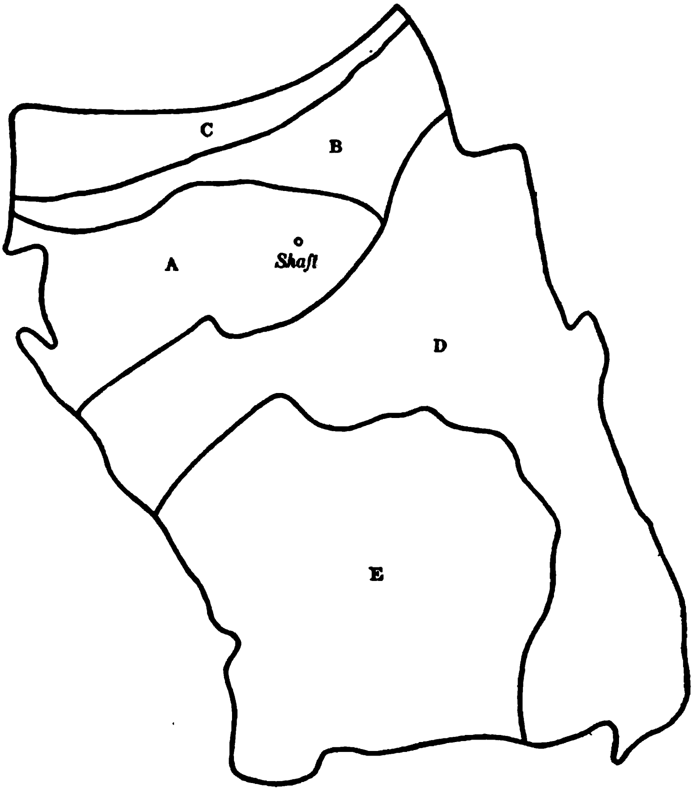


FIGURE 2. Scale: 32 chains per inch (1 chain = 66 feet).

Diagram showing various holdings comprised in the coal field attached to a large colliery in the county of Durham, England.[3]

It is not so easy to secure examples to show the practice in the United States where the lease system is not so firmly established as in England with its estates retained in one family for generations. In this country it is estimated that 65 per cent of the bituminous coal comes from land owned by the mine operator. The remaining 35 per cent comes from leased land.[4] In the production of anthracite coal the percentage is even greater. Previous to the enactment of the commodity clause in the Interestate Commerce Act and its enforcement, almost 80 per cent of the anthracite was mined by the railroads or by companies controlled by the railroads; and it was estimated that the railroads and affiliated companies controlled either by ownership or by contract over 96 per cent of the unmined anthracite.[5] It is true that the railroads leased the coal lands to operating companies, but the royalties were a nominal charge and bore little relation to the true value and accessibility of the coal. The railroads controlled the operating companies and received their profits. They also received the freight money for hauling the coal to market. The Girard Estate, administered by the city of Philadelphia, owns large areas of anthracite coal lands that are leased to operating companies. Unfortunately for our purpose the royalties are not a fixed payment per ton but are a percentage of the selling price of the coal at the breaker — or in other words they are based on a sliding scale. However at least one of the intrinsic factors is evident in the determination of that scale. In some leases 18 per cent of the selling price is charged on coal from seams over 4 feet in thickness, and 16 per cent on seams under 4 feet. In other leases the percentages are fixed at 20 and 16 per cent or at 28 and 23 per cent.[6]

---

[3] Second Report, Royal Commission on Mining Royalties, British Sessional Papers, 1890–91, vol. xli. Appendix XX.

[4] Thirteenth Census Report (1909), Mines and Quarries, p. 210.

The quotations on pages 298, 299, and 300 from publications of the United States Geological Survey show also that in the United States, where any attempt is made to determine the royalties accurately, the same principles hold as those which govern royalties in the United Kingdom. They are partly compensation for the mineral removed and partly surplus or economic rent arising through superiority of some mines over others.

---

[5] Eliot Jones, The Anthracite Coal Combination, pp. 108, 109.

[6] U. S. Senate, Hearings of Committee on Manufactures, 65th Congress, 2d Session (1919), vol. iii, p. 1717.

The analysis of mine royalties may perhaps be made clearer by a graphic presentation. Figure 3 is an attempt at such a presentation.

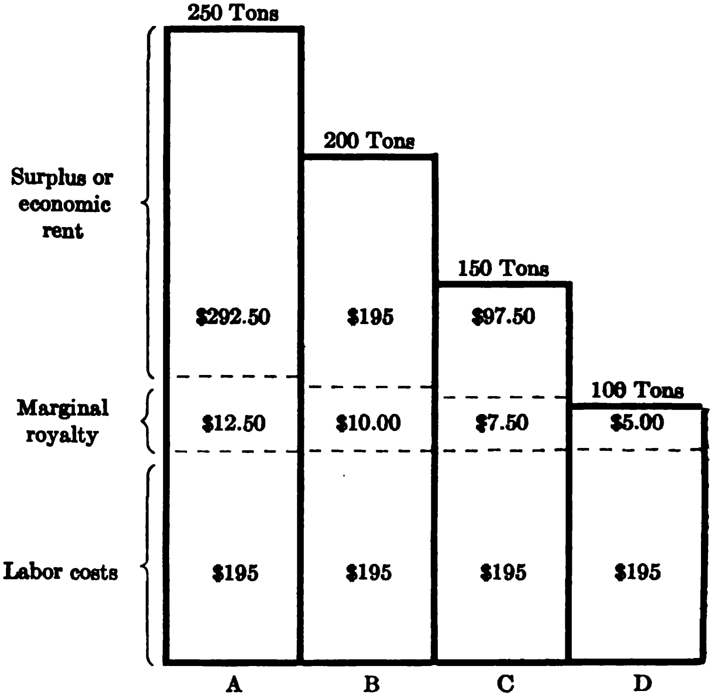


FIGURE 3

Four mines are represented, located in the same mining district and producing the same grade of coal. They differ only in depth of seams. All production costs are reduced to labor costs for the sake of clearness and it is assumed that an equal quantity of labor is employed in each mine — say ten units. From Mine A is obtained 250 tons of coal per week, from Mine B 200 tons, from Mine C 150 tons, and from Mine D 100 tons. Since the quantity of labor employed in all four mines is the same the greater yield of the first three must be due to the greater ease of working the shallower seams. Coal is selling at the mine mouth at $2.00 per ton. Thus the value of the weekly yield of Mine A is $500, of Mine B $400, of Mine C $300, and of Mine D $200.

The current wage of mine workers in the district is $19.50 per week and each mine must pay out for its ten units of labor $195. After wages are paid at Mine D, the poorest mine in the district, $5.00 remains. It is not surplus. It is the amount that must be paid to the owner of the land for the coal removed. It is the marginal royalty and Mine D is the marginal mine. With a production of 100 tons the marginal royalty on each ton is 5 cents, the estimated marginal royalty at the present time for coal mines in the United States and Great Britain. Mine C yields 150 tons of coal per week with a value of $300 at the mine mouth. One hundred and ninety-five dollars must be deducted for wages leaving a balance of $105 from which must also be deducted the marginal royalty. The coal from Mine C is worth no more than the coal from Mine D when it reaches the surface and can command only the same marginal royalty — that is 5 cents per ton. More coal has been extracted during the week and the total marginal royalty on Mine C is $7.50 instead of $5.00. When this amount is subtracted from the balance of $105, $97.50 remains. It is a surplus arising because of the superiority of Mine C over Mine D. It is economic rent. Mines B and A have even greater advantages over Mine D and yield a larger surplus. Table V is an analysis of the value of the output for the four mines.

It is immaterial to the correctness of the theory of rent how the surplus is divided. If there is a surplus it must go to some one. Since the coal from all the mines sells for the same price at the mine mouth and all mine labor in the district receives the same wage, neither consumer nor laborer can share in the surplus. It must go either to the owner of the land or to the operator of the mine. If the owner is fully awake to market conditions and to the superiority of his land he will secure the entire surplus; if he is not, the operator will receive a part. The fact that owner and operator may be one and the same person does not affect the existence of the surplus.

TABLE V

Mine	Tons raised per week	Value of product	Weekly wage	Marg. royalty		Surplus or economic rent	Economic rent per ton	Royalty that may be exacted per ton
				Per ton	Total			
D	100	$200	$195	$.05	$5.00	$0.00	$.00	$.05
C	150	300	195	.05	7.50	97.50	.65	.70
B	200	400	195	.05	10.00	195.00	.975	1.025
A	250	500	195	.05	12.50	292.50	1.17	1.22

Since there remains, after wages are deducted, a surplus of $305 from Mine A, or $1.22 for every ton mined, the owner of the land may demand that amount as royalty. Five cents per ton is the marginal royalty, the remaining $1.17 is economic rent. Mine B yields $1.025 per ton royalty, of which 97½ cents is economic rent; Mine C yields 70 cents per ton of which 65 cents is economic rent; Mine D yields 5 cents per ton, all of which is marginal royalty.

With agricultural land there may be either an extensive margin, reached by adding successively poorer pieces of land, or an intensive margin, reached by adding increments or doses of capital or labor to the same pieee. In the latter case economic rent arises as soon as the law of diminishing returns begins to act. With mineral land an intensive margin may be reached providing the law of diminishing returns holds for mines. Professor Marshall is of the opinion that it does not, since the yield of mines is not "a net yield, like the return of which we speak in the law of diminishing returns, . . . but merely a giving up of their stored-up treasures."[7] Most economists believe, however, that the law of diminishing returns applies to mineral land as well as to agricultural land tho some qualifications of the law may be necessary. The operator desirous of increasing his production has the choice of applying more labor and capital to the mine already being worked or of opening a second deposit less favored in its conditions. The working of rich and poor mines side by side would indicate that it is more profitable to apply capital in the poorer mines than to add it to the capital already applied in the richer mine. It is an evidence that the law of diminishing returns does apply to mines. The number of men who can work in a mine is limited by space if by nothing else and there is a similar limit to the amount of machinery that can be used. A hundred men might work a mine effectively but an increase of the number to a thousand would most certainly not increase the product tenfold. If the law of diminishing returns did not hold for mines operators could remove all the coal from a deposit in a short period of time rather than work it for 20, 50, or 100 years.

Figure 3 also shows economic rent arising from an intensive margin. Each block, instead of representing a mine as in the first illustration now represents the product from succeeding increments of capital applied to one mine. The first increment, dose A, yields 250 tons of coal per week, sufficient for a time to meet the demands of the market. There is no surplus and no economic rent. The situation is similar to that which would exist in a new country with an unlimited area of equally fertile agricultural land producing all that the market demanded. Farm land would command no rent. With increasing population more coal is demanded than can be produced by the first increment of capital. Prices rise until finally the operator of the mine adds another increment of capital to increase his production. If demand continues to increase he adds other increments. Because of diminishing returns dose B adds 50 tons less than the yield of dose A, or 200 tons, and doses C and D add but 150 and 100 tons respectively. The price of coal is $2.00 per ton, an amount sufficient to make profitable the addition of dose D but not sufficient to warrant the addition of dose E. Dose D is the marginal dose and the preceding doses each yield a surplus. That surplus is economic rent. With the intensive margin, just as with the extensive margin of the first example, a marginal royalty must be deducted before the true economic rent can be determined. The marginal royalty is the balance remaining after all other production costs have been deducted from the yield of the marginal increment of capital.

---

[7] Marshall, Principles of Economics, p. 166.

III

What bearing does this analysis of mine royalties have on the question of nationalization of mineral lands? Who will receive the payments now going to the owners of the land if property in mineral deposits is taken over by the government? If the government does not confiscate minerals but buys them at a going value there will be nothing to divide, so long as conditions remain the same as at the time of purchase. The returns from the mines will go to pay the original owners or to pay interest on money borrowed to purchase the minerals.

Neither consumer nor laborer can benefit except through improved operation of the mines or more efficient distribution of the product under government control. True, conditions may not remain the same as at the time of purchase. The demand for coal may increase and make necessary the opening of inferior mines thus lowering the margin and increasing the economic rent. Any additional rent then received by the government might be divided according to the principles set forth in the next paragraph.

If the government should confiscate all property in minerals, a procedure inconceivable in either the United States or Great Britain, the distribution of the royalty will depend on which of the various courses open to the government is followed. The government may operate the mines itself; it may lease the mineral rights under competitive bidding to private operators; it may grant mining permits without any charge or for a nominal fee. If the first course, government operation of mines, is adopted, the government may either cover into the treasury the payments now made to land owners as royalties, or it may pass them along to the consumer through the decreased price of coal or to the laborer through increased wages, the surplus of the richer mines being used to offset the higher costs of production of the poorer mines. If the government leases the mineral rights in the open market to private operators, the only change in the present situation will be that the royalties will be paid to the government and not to a private land owner. Neither consumer nor laborer will benefit unless the revenue from the mines makes it possible to lower taxes.

The government may adopt the policy of free mining, that is the granting of mining permits to any applicant without charge or for only a nominal fee, a policy followed in many European countries. The mine operator pays no royalties either to the government or to the owner of the surface. In favor of such an abolition of royalties it is argued that the price of coal to the consumer will thus be lowered. Yet if the entire amount of the royalty be passed along to the consumer, the saving would not be appreciable. The following is an analysis of the cost of a ton of Derbyshire coal laid down in the cellar of a London consumer:[8]

	s.	*d.*
Royalties	0	4
Wages	13	5
Supplies and stores	3	6
Administration	0	5
Depreciation	0	4
Owner's profits	2	5
Coal controller's profits	0	9
Screening	2	3
Railway rate	6	3
Wagon hire	1	6
Factor's charge	0	4
Merchant's charge	12	6
Total	44	0

Removal of the royalty would accomplish a saving of 4 pence on a selling price of 44 shillings — less than .8 of one per cent. Certainly the abolition of royalties does not promise any great benefits to the consumer. He must look elsewhere for means of reducing price. Such means are not hard to find. It should be noted in the above table that almost one-half of the cost of the coal is added after it leaves the mouth of the mine (cost at pithead 23*s.* 5*d.*). Material savings could be realized through the elimination of the 700,000,000 coal ton miles wasted in railway haulage because of cross hauls, through the pooling of the 700,000 colliery trucks now confined strictly to use of owner, and through the elimination of the wastes of wholesale and retail distribution.[9] A saving of from 2 to 5 shillings per ton, and as high as 12 shillings per ton in some cases, has been brought about in England by the Coöperative Movement. It is in these ways, not through the abolition of royalties, that a substantial lowering of price to the consumer might be secured.

---

[8] British Coal Industries Commission Report (1919), vol. i, p. xii.

Small as the saving would be if the consumer should receive the entire amount of the royalty, he could not receive even this much. Figure 3 may be used to show just what the division of the royalty would be.

Mine D is the poorest mine that can be operated under existing market conditions. The only royalty paid on Mine D is the marginal royalty of 5 cents per ton and that amount would be the only saving to the operator of Mine D through the abolition of royalties. He can produce coal at $1.95 per ton; but for a time he may continue to sell at $2.00 per ton and pocket the saving.

Mines A, B, and C would benefit by the abolition of royalties to a greater extent than Mine D. The cost of production at Mine A would be 78 cents per ton, since the only cost of the 250 tons would be the labor charge of $195. At Mine B the cost would be 97½ cents per ton and at Mine C, $1.30. The price of coal is governed, however, not by the cost of production at the most fertile mine but by the cost at the least fertile. All the coal mined would sell at the market price. The more fertile mines would continue to yield a surplus or economic rent. It would now go to the operator of the mine instead of to the former owner of the deposit. The consumer would receive only the saving realized at the marginal mine, or the marginal royalty of 5 cents per ton.

Because of the increased profits a fifth mine may finally open producing 97½ tons of coal with 10 units of labor or at a per ton cost of $2.00. The market would not demand the additional 97½ tons at $2.00 per ton and the price would have to fall. The new mine would be forced to close and a new market price would be established. Since the supply price is now somewhat lower than the former market price, more coal would probably be consumed. The new equilibrium would, therefore, be not at $1.95—which is sufficient to bring to market only the former supply—but at some point between $1.95 and $2.00, say $1.98 per ton. The consumer would receive not even the full amount of the marginal royalty. To recapitulate: *Only that part of the royalty which is compensation for the mineral taken from the land, or the marginal royalty, as I have called it, enters into price. The remainder, or the economic rent, does not affect price.*

---

[9] British Coal Industries Commission Report (1919), vol. i, p. xix.

It may be argued that with the abolition of royalties the richer mines, say Mine A of the example, operating at lower costs, may attempt to supply the entire market. Mine A can produce coal at 78 cents per ton and mines B, C, and D, unable to compete with such a low price, would be forced to close. Their production would be lost to the market and Mine A would have to increase production to meet the demand. The operation of poorer mines in the district would indicate that A is producing at the point of maximum efficiency. More intensive operation would bring into play the law of diminishing returns. The additional tons could be brought to market only at increasing costs. If the equilibrium between the four mines had been a stable one it would cost as much, or more, to produce in Mine A with intensive operation the last ton demanded by the market as it would cost with extensive operation in Mine D. As production costs in A mounted, Mines B, C, and finally D would reopen.

Labor has looked to the complete abolition of royalties as a means of increasing its wage. But the rent of mines has no more effect on wages than it does on prices. There is in every mining community a general level of wages. The worker in the fertile mine receives no more than the worker in the poor mine. Otherwise there would be a movement of workers from the poor mines to the fertile. The royalty takes nothing from the worker, since the poorest or marginal mine pays no royalty except the marginal royalty. This amount would probably reach the consumer through competition; but labor might succeed through a strong combination in stopping some of it. But the benefit would be small even if labor received all. The minimum royalty for coal in England has been estimated at from 2 pence to 3 pence per ton. At the latter estimate the amount to be divided among the 1,000,000 coal mine workers in Great Britain in 1918 would have been about $15,300,000, or an increase of only some $15.00 to the yearly wage of each. The amount that would go to the mine workers through the abolition of royalties was placed at about 1 shilling a week (about $12.50 a year) by a witness before the Coal Industries Commission.[1]

Labor has also favored the abolition of royalties on the ground that the better mines would then be able to supply a larger part of the production and force out the poorer mines. Wages would be increased because of the greater efficiency of the workers in the fertile mines. I have already pointed out that there would probably be little change in production; but even if the margin were raised the worker would suffer more than he benefited. If the better mines forced the marginal mines to close down, the laborers of the latter would be without em-

---

1. British Coal Industries Commission Report (1919), vol. ii, p. 439. Testimony of Mr. Harold Cox, Editor of Edinburgh Review.

ployment. In the resulting competition for the jobs in the mines still in operation, I should expect a decline in wages rather than an increase.

To conclude: after nationalization of mineral rights, if the government operates the mines, a part or all of the present royalties may be passed along to consumer or to laborer. If a middle course is followed, the government taking the place of the present land owners and leasing the mineral rights to private operators, neither the consumer nor the laborer can benefit directly. Indirectly they may benefit through lower taxes if the venture should prove sufficiently profitable to the government. If all royalties are abolished and free mining is permitted, the consumer and laborer can benefit only by the amount of the marginal royalty. The more fertile mines will continue to yield a surplus and that surplus will go to the operator.

JOHN E. ORCHARD.

COLUMBIA UNIVERSITY.

REVIEWS

DAMIRIS' THE MONETARY SYSTEM OF GREECE[1]

THE author of this book was a highly gifted, zealous young Greek. He won the doctorate both in Athens and in Paris, subsequently entered the diplomatic service, and finally became director of the financial department of the Reparations Commission in Vienna, where he died in the autumn of 1921. The present work gives evidence of the loss which his country as well as his science suffered through his death. In view of the great significance of currency questions today, a summary of the contents of this careful and lucid study should be of interest to American readers.

After falling to a discount of 80 per cent as compared with the French franc in 1895, the Greek drachma gradually recovered. This was facilitated, of course, by the international financial control imposed upon the country in 1898. A favorable balance of payments, a reduction of the country's note circulation, together with the increase in the world's gold stock, brought about a rise in the value of the drachma, till it eventually, in 1909, was for a time quoted at par with the French franc. (Damiris, vol. i, p. 48.) Now it was a question of devising means of stabilizing this value, lest a further increase in the value of the country's money should hamper its export trade. On March 19, 1910, therefore, an amendment to the bank law, proposed by the vice-president of the Bank of Greece, Valaoritis, was adopted by the Dragoumis ministry, authorizing the bank to expand its note issues in proportion to the increase in its holdings of gold or gold bills. From that date, it purchased from private citizens bills payable in gold

[1] Damiris, Christo T., Le Système Monétaire Grec et le Change. Paris, Giard & Co., 1920, three vols., pp. 363, 359, 238. 70 *fr.*

abroad, paying in bank notes, and sold the foreign bills thus acquired at an advance of one and one-half per cent to traders in need of them, thereby retiring the notes previously issued, which meanwhile had been covered by the gold bills.

This innovation resulted in no alteration in the course of exchange, because the additional notes, under the given exchange rate, were completely covered, and because their quantity was at the same time proportioned to the monetary needs of trade. The note issue remained elastic — it expanded during periods favorable to exports and contracted during the periods of wheat imports; and the currency remained stable — because the bank bought foreign bills at par and released them again at a slight advance. In this way the gold reserve of the bank was replaced in part by claims upon foreign countries. In case of a protracted balance against Greece these credits would have been exhausted; moreover, if any of the debtor countries had gone on an inconvertible basis, the foundation of this note issue would likewise have been greatly weakened.

During the Balkan War, 1912–13, the bank took up foreign bills, paying the state in notes, as it did private individuals who sold them; exchange remained at par. The currency system was sound and functioned undisturbed on the basis of the system just described.

During the World War there arose a scarcity of foreign bills payable in gold, and the currencies of the belligerent countries depreciated compared with neutral funds. The Bank of Greece therefore prudently ceased to quote exchange on New York and reduced its credits in western Europe in favor of credits in the United States. The balance of payments remained favorable as a result of the large profits earned by the country's shipping. The volume of notes in circulation in Greece had, it is true, increased three and one-half fold from 1914 to 1919, but the note circulation in both France and Italy had increased five and one-third fold, and the notes issued under the law of 1910 gave a command on credits in dollars. The situation was rendered serious, however, by the fact that the sums allotted to Greece by the

Allies were in terms of francs and pounds, whose price was falling, and that they consisted of credits upon which Greece would not be entitled to realize until six months after the termination of the war. In addition there were the material effects of the World War on Greece. This country like others restricted the export of capital, while the submarine warfare hampered shipping and commerce. Consequently the domestic demand for foreign bills declined, so that the additional notes did not flow back to the bank, but remained in circulation, intensifying the rise of prices already occasioned by the general scarcity of commodities.

After the collapse of the Central Powers, Greece had to remain under arms and hold her troops at the disposal of the *Entente*. The government was compelled to cover its need for notes by internal loans and bank loans. The war had reduced the country's stocks of goods, and consequently the balance of trade became more and more unfavorable. Moreover, the Greek banks undertook to finance the imports of Jugoslavia, Rumania, and the sections of southern Russia occupied by the Allies. So the country's dollar credit reserve collapsed and it had only English and French government credits to rely on. The bank had to sell dollar funds to interested parties and itself received only pounds and francs, whose value in terms of dollars was falling.

At the beginning of 1920 the law of 1910 was fundamentally changed by order of the government: the foreign credits still available could be utilized only for certain purchases approved by the government. In practice they were reserved for the government's needs in the way of foreign coal, petroleum, cereals, frozen meats, and other necessaries. The issue of notes against bills was still allowed for the needs of commerce, but the sound basis was taken from the notes. The drachma then declined parallel with the pound and later parallel with the French franc. The currency depreciated and lost its stability, so that all commercial relations were constantly upset and took on an aleatory character. On the basis of these developments the author advocated a return to an improved form of the system of 1910. Above all he urged an additional gold cover for the notes issued on the security of foreign credits. It also seemed to him doubtful whether the Greek system could be made the foundation of a system of international notes, as had been suggested.

The system introduced in 1910 was an interesting modern experiment in the field of currency. It is instructive and suggestive for the theory of the gold exchange standard, with the other forms of which the author compares the Greek currency from 1920 to 1910. Herein lies the theoretical value of his work.

EUGEN P. SCHWIEDLAND.

VIENNA, AUSTRIA.

SHARFMAN'S AMERICAN RAILROAD PROBLEM[1]

PROFESSOR SHARFMAN is already well known as a teacher and writer in the subject of railroad economics. His present book is divided into three parts. Part I is entitled "The War Administration of the Railroads" but includes also an outline history of the relations between railroads and public prior to 1914. In Part II the author sets forth what he believes to be "The Essentials of Reconstruction Policy." And in Part III he describes and discusses "The Elements of the Railroad Adjustment."

The work is well organized. The phraseology is well chosen and the style effective. If there be fault in the style, it lies in the use of sentences occasionally too long and involved. The impressiveness of the style, together with the effective organization of the matter, seem to carry of themselves such weight of authority as almost to disarm criticism in advance.

Nevertheless, criticism cannot be avoided. And it must be leveled against what appears to be the author's underlying philosophy regarding the basis of rate reasonableness. The central part of the book, to which the historical sketch leads and from which the description and discussion of present legislation follow, is perhaps the most important part. And probably the most important paragraphs in this part of the book are those which deal with the regulation of railroad rates and with standards of reasonableness of rates. The problems of rate reasonableness and rate regulation have been those of principal significance in the relations between the railroads and the public. It is these and related problems to which most attention has been given in the past, which have in general most concerned business men, commissions, and legislatures, and which are still not solved in a way wholly satisfactory. It is in his study of rate standards and rate regulation that, the reviewer believes, Professor Sharfman

[1] I. Leo Scharfman, The American Railroad Problem: A Study in War and Reconstruction. New York, The Century Co., $3.00.

has most signally failed in the adequacy and convincingness of his analysis. Indeed, the reviewer believes the solution offered to be fundamentally unsound.

Let us consider, first, the basis of valuation on which reasonable return and therefore rates are to be calculated. The view which seems to have the largest amount of authoritative support is that valuation of railroad property for rate-making purposes should be based on cost of reproduction of physical plant. Certain qualifications of course are necessary. From cost of reproduction new must be subtracted depreciation. Also, if plant is in excess of reasonable requirements or is constructed in an unnecessarily expensive way, or is in part obsolete, its value for rate-making purposes should not be reckoned as the cost of exact duplication. Rather should it then be reckoned as the cost of bringing into existence a plant capable of adequately performing the required service. Possibly other qualifications of the cost of reproduction standard should be made. Professor Sharfman, however, adopts frankly the view that the proper capital value for rate making, the value on which a fair return should be allowed, is the *original investment*. His statement is (p. 303): "Actual cost of the property used in the transportation service, or actual investment committed to railroad enterprise, when honestly and prudently made, constitutes the natural basis for the computation of the fair rate of return to which those engaged in the operation of a public service industry are reasonably entitled." This statement, taken by itself, might be understood to mean that the value of a right of way acquired seventy years ago and of a roadbed and terminals then constructed should be reckoned, for the purpose of determining rates to yield a fair return, at what they then cost. The author does not, however, insist upon this view without qualification. He believes that, since rates have been long regulated without regard to original investment and since the amount of such investment cannot now be ascertained, both due respect for vested rights and practicability forbid the attempt to make the actual basis what he regards as the ideal basis. His actual proposal, then (p. 305), is to accept the

Interstate Commerce Commission's "present value" (after the completion of its valuation of railroad properties) "as a starting point for the rate-making base, with an express legislative provision that, for the future, actual additional investment, honestly and prudently made, is to constitute the only valid claim for an increase in this value." In other words, the author would so arrange matters that the value upon which a railroad or group of railroads might be allowed a fair return forty years from now would be, substantially, "fair value" *now*, plus actual investment in additions and betterments *during* the intervening forty years. At the end of the forty years, not only all new railroads but a considerable part of old ones would be valued on the original-cost basis rather than on anything resembling a cost-of-reproduction basis. And progressively, as time went on, would cost of production become more important, relatively, as the basis of valuation. The issue is clearly joined, therefore, between cost of production and cost of reproduction as the basis of valuation for the purpose of rate regulation.

Perhaps the line of cleavage between the two viewpoints and the reasons for adopting one rather than the other can be best illustrated by reference to the changing value of the land required for the building of a railroad. Indeed, the so-called unearned increment of land value is very likely what Professor Sharfman has in mind, at least in large part, when he says (p. 303): "If railway earnings were based upon such investment, the owners of the properties would receive as liberal a return as they may legitimately claim, and the users of the service would be relieved of the burden of paying a return, through the medium of transportation charges, upon such speculative increments of value as arise independently of the performance of the transportation function."

The first comment which it seems fitting to make in this connection is that, so far as the unearned increment of land value is concerned, society cannot lightly deny it to the railroads while permitting it in all other lines of business. To tax this increment heavily wherever it occurs, to tax it altogether out of existence, even to tax land values in general at so high a rate as to appropriate all economic rent for public purposes, may be a desirable policy. But there is obvious objection to doing away with the unearned increment of railway land while allowing owners of land used in all other ways to enjoy such an increment. Such a policy, if frankly adopted, would operate to prevent railroad building. For if the would-be builders and owners of a prospective railroad know that they cannot receive a gain which, if they use the land otherwise they will be permitted to receive, they will prefer some other use or uses. A railroad company must buy the land it is to use at a price as high as would probably have to be paid for it by persons intending to use it otherwise. This price would be higher in a growing country than the present income would justify, because of the anticipation of future gains. The expected future increment would affect, for all uses, the present price. But an industry which, alone among all others, could not hope to enjoy such future gains, could hardly afford to pay for the land so high a present price as the others.

Perhaps Professor Sharfman would say, however, that the denial of an unearned increment in the railroad business might be compensated for by allowing higher current earnings. This would, perhaps, not be quite consistent with his view that valuation on the basis of original cost would relieve the public "of the burden of paying a return" upon "speculative increments of value." But it may be implied when he says (pp. 303, 304): "Nor would the acceptance of this investment basis necessarily lead to an illiberal rate policy. The needs of the transportation service and the exigencies of the credit situation must always be taken into account in the adjustment of the level of charges."

Such a reply, however, would not be sufficient. For to the policy suggested in it serious objection may be offered. Consider the case of a young and growing community in which railroad building is desirable. To compensate the railroads for not permitting them to enjoy the to-be-expected increased value of their land, when such enjoyment is permitted in all other lines of business, they must be allowed to derive more income from their current rates. Since their land will not be reckoned as worth more in future years, in the sense that the railroads may then be allowed to enjoy a return on such larger value, they must be allowed to enjoy a larger return now. But at the beginning, when a territorial section is comparatively undeveloped and land values are low, traffic is ordinarily light. Under such circumstances, rates, to make the investment worth while, have to be high at best. And in order that returns on the investment should be high enough to make up for the unearned increment which is receivable in other lines and the expectation of which the railroads have to pay for in the price of land, rates must be still higher. (To permit high rates, needless to say, does not insure that the traffic can bear high rates.) Later, when the community has grown and traffic is heavy, rates would be forced to a very low level on the author's principle, since only low rates are then necessary to pay a return on original cost. Relatively, as between the earlier and the later period, is not this a curious way to "charge what the traffic will bear?"

But the clearest evidence that such an arrangement is undesirable is to be found in the consideration of the reverse possibility — a declining community and a decreasing value of land. The author's proposal to base rates on original investment rather than on present fair value would in such circumstances, if carried into effect, have most serious consequences. It would be necessary that net returns should be as large as ever, since the original investment is the standard of reasonableness. But with declining population only progressively higher rates would accomplish this end; and such rates would hasten the decline. If it be said that the higher rates could not in fact be charged, this would be an admission that the scheme of basing rates on original cost might prove not only undesirable but impossible of application. Surely it has no advantages from the viewpoint of public welfare over a system of basing rates on the fair present value of plant and equipment used.

The way to regulate the charges of a monopoly so as neither to unduly encourage nor to unduly discourage the industry is to make the relation between earnings and investment as nearly as possible what it would tend to be under competitive conditions. To accomplish this purpose cost of reproduction is a better standard than original investment. For what determines the prices which a concern engaged in a competitive business can charge? Obviously, what its competitors charge. And this, in large degree, is what new entrants to the business can charge. However high may have been the necessary cost of a plant in a given competitive business, prices of the goods produced cannot be kept high if new concerns can construct equivalent plants at low cost. And on the other hand, however low the amount which concerns already in such a business had to pay for necessary real estate and equipment, if the cost to new entrants is high, these new concerns will not come in unless they expect to be able to charge prices commensurate with the present cost of plant. The old concerns then can charge prices about equally high without being driven out of the business.

Another matter connected with rates, as to which the author's underlying philosophy is believed to be no less mistaken, deserves extended discussion. Professor Sharfman proposes to limit the financial returns of the more successful roads (to some extent, the act of 1920 does so) to the advantage of the "weaker" or less successful. He proposes not only that this be done directly through the partial appropriation of surplus or excess earnings, but he considers it an argument in favor of consolidation of railroads into larger systems that the process may bring weaker and stronger roads into the same organization and so obviate the supposed difficulty of unequal earnings. "The stronger roads often prosper," he remarks (pp. 233, 234), "under a schedule of charges that drive the weaker roads to ruin; and the provision of adequate revenue for the weaker roads frequently leads to excessive returns for the stronger. . . . It is obvious . . . that a far-reaching policy of unification would help dispose of this so-called strong and weak road problem. . . . Rate schedules could then be uniformly applied to all the roads in a given region, without starving some and allowing unreasonable profits to others."

Surely this view cannot be allowed to pass unchallenged. If one railroad lies in a territory where natural resources are rich and population dense and so makes large returns on its original cost; and if another lies in a territory where natural resources are poor and population sparse, so that its traffic hardly pays the cost of operation — is it desirable that, through combination or otherwise, one should subsidize the other? Is it desirable that those regions which have natural advantages should, through transportation rates which, however low they seem, are unnecessarily profitable to the railroad serving them, subsidize indirectly other regions where the natural advantages are so slight that industry cannot live if it has to pay reasonable transportation rates? Must not such a policy tend to drive industry out of the places where it can be most effectively carried on and encourage its location where its output would be less? Should we not more probably get industry into those regions where the largest output could be secured with the least labor if we endeavored so to adjust rates that the industries and people of each region would have to pay the reasonable cost of the transportation system serving them? And if an unduly circuitous transportation system had been mistakenly made or if a transportation system had been constructed at undue expense for whatever reason, ought not its owners to suffer the loss?

Closely associated with this matter of consolidations is the common notion, to which the author gives support, that (p. 237) "a line that is weak when standing alone may prove to be a valuable connection or feeder for a larger system." But why may a road prove to be a valuable feeder to a larger system? Must it not be because such a road brings to that large system traffic on which the large system can charge rates covering much more than the incident additional expense imposed in carrying it? Such traffic, then, would be worth taking by the large system at lower rates than are charged. In other words, if the so-called weak road got a larger share and the strong road a smaller share of the total rate on traffic moving over both, the stronger road would still find the traffic worth taking — and the weaker road would not be so "weak!" If the necessary cost of transportation on the so-called weak road is high, and if the strong road can afford to take a lower rate rather than not get the traffic, why not give the former road a large enough share of the rate to cover the cost of a service from which the latter also profits? Is it really true that a road which, with such a division of rates (a division giving it what its services are worth), could not be made to pay its way, is nevertheless *valuable as a feeder* to a strong system?

Discussing, elsewhere, the problem of strong versus weak roads, the author says (pp. 305, 306): "The level of charges established in accordance with its terms [i. e., a policy of fixing rates in relation to investment] would be applicable, not to individual roads, but to the carriers as a whole, or as divided into rate-making groups. But since this rate level would provide uniform charges for competing lines, and for carriers performing substantially similar services, the stronger roads — those possessing special advantages because of favorable location, an early start, government aid, or superior management — would be enabled to realize excessive earnings from the performance of their public service. Such an outcome is bound to persist under any system of private management involving multiple corporate ownership. No uniform rate level can produce the same financial results for the weak roads as for the strong. And in the absence of a comprehensive system of railroad consolidation, these differences in earning power are very glaring, and give rise to large corporate surpluses that should equitably be vested, to a large extent, in the public."

The first comment which suggests itself in this connection is that while competitive rates may have to be approximately the same for both strong and weak roads if both are to get a share of the business, non-competitive rates need not be. And many of the rates made by most railroads are non-competitive. Thus if the Norfolk and Western Railroad is a "strong" road between Cincinnati and Norfolk and the Southern Railway a "weak" road, the rates from Cincinnati to Norfolk may have to be the same for both. But the rates from Cincinnati to intermediate points on the more roundabout Southern line may very properly be higher if the lightness of the traffic or some other adverse condition requires high rates to make the road profitable. Such higher rates are better for the intermediate points than would be the absence of the railroad. If the longer line has been built over the chosen route *in order to serve those points,* it is probably not economically desirable that the rates between Cincinnati and Norfolk which the stronger line can make low *without any discrimination against its intermediate points* should be arbitrarily made high and industry thus forced away from Cincinnati and from Norfolk in order that other points may be developed. And for the Southern Railway to meet the rates at the competitive points — provided these rates cover all extra incident costs — does not make the relative position of the intermediate points on its line any worse than it otherwise would be. If there are any good arguments for forcing the development of the territories served by "weak" lines through charging higher than necessary rates between points where the traffic is competitive with "strong" lines, the author does not state them.

It may properly be admitted, however, that even when intermediate rates are made as high on weak roads as they reasonably can be made, and even when rates are reduced on the strong roads as far as possible without being made discriminatory, the earnings of these different roads may still be very unequal. Sometimes the amount of non-competitive traffic may be relatively so small that both weak and strong roads depend on competitive traffic for the major part of their incomes. Then rates high enough to be remunerative to the weak road may be unduly profitable to the strong one. Is such inequality of incomes then unavoidable? If the strong road can handle all the traffic, it is a serious question whether a wise economic policy would keep rates high in order that (say) an unintelligently located road which is not needed may make a good income. If the strong road cannot handle all the traffic and the weaker road is needed, then rates are called for which are remunerative to the weaker road. Tho the strong road might be able to afford lower rates, yet, since it cannot serve all the shippers, such rates would give to some shippers a special privilege. In such a case, however, there is an alternative to the policy of diverting some of the large returns of prosperous roads into a subsidy for weaker roads. This alternative is a policy of taxation. And, indeed, there would seem to be at least one very clear advantage of such a policy over a policy of putting the surplus incomes of the successful roads into a fund to be used for the benefit of the less successful. This advantage is that, by the method of taxation, the excess incomes are used for the benefit of the entire public and not for the benefit of a part only — the shippers and consumers along the lines of aided roads. If the funds raised are used for the benefit of the *whole* public rather than for the benefit, direct or indirect, of special regions, their appropriation will not be likely to divert industry from places where it can be carried on most effectively to the places favored by subsidies.

What are the things that make a railroad "strong" or "weak." Professor Sharfman says (p. 233): "Shorter routes, better grades, more favorably situated terminals, and more thickly populated territory are among the factors which tend to differentiate strong from weak roads, but they do not justify exclusive private appropriation of the savings that result from these advantages." Let it be agreed that exclusive private appropriation of these savings is not desirable. But let it be added that their use for the benefit exclusively either of weak roads or indirectly of the regions such roads serve, is also undesirable. To the extent that rates on the strong roads can be reduced without discrimination, without reducing their situation rent below what the land would yield in other uses, and without depriving them of the benefits of superior management, this should be done. What surplus then remains to them is, for the most part if not entirely, either the result of superior management or due to situation advantage. So far as it is the former, it may be well to leave it to the railroads as a proper reward for and inducement to good management. So far as it is the latter, a general system of levying special taxes on the situation value of land would meet the difficulty. We may not be able without injurious consequences to levy a special tax on the situation value of railroad land while leaving other land less taxed. But if economists in general could cease to regard special land-value taxation as taboo, if they could worship science more and the fetish of vested rights that must not be even gradually or a little interfered with less, if they could accept the eminently sane "liberalist's program" of Professor Carver (*Principles of Political Economy*, p. 583) with "increased taxation of land values" as its first suggestion, many problems which now seem puzzling might become simpler of solution. Perhaps the taboo which constantly turns conservative economists away even from the serious consideration of such a solution, forcing them into the suggestion of all sorts of roundabout and uneconomic devices to deal with our economic ills reveals the operation of a kind of "suppressed" logic as in another phase of human life there are said to be "suppressed desires." And the results may be as bad in the one case as they are reputed to be in the other.

Historical studies of problems and legislation have their sufficiently important place, and some of the material presented in Professor Sharfman's book is interesting and valuable. But if we are to make the study of economics of real significance for the solution of difficult problems we need most of all to analyze these problems in the light of fundamental principles. This does not mean that there is in the study of principles no place for inductive reasoning. Often there is. But studies of occurrences and policies in their chronological order, coupled with commentary and discussion, do not constitute inductive investigation as the expression is understood in physical science. It is an interesting fact—let economists who like it comment in what way they choose — that so-called advanced work and the text-books of such work in economics, in many American universities and colleges if not in most, are more factual, more descriptive and less analytical than the introductory course. The student first studies some fundamental theory. Afterwards he studies foreign trade policies with a little theoretical commentary, or public finance with much description of budgets and tax systems and a slight amount of time devoted to the theory of shifting and incidence, or transportation with emphasis on historical development of railroad systems, description of legislation and a very limited discussion of principles. The advanced student in mathematics, physics, and allied subjects delves deeper into the intricate mysteries of his subject than the novice. The advanced student in economics too often retires from his point of greatest analytical progress and amuses himself in easy by-paths — because his teacher asks it of him.

In fairness to Professor Sharfman it should be said that his book is no more purely descriptive and narrative than the generality of books in the field. None the less, it is not fundamental enough. Perhaps the author should not be blamed for doing better than many others the kind of thing that so large a number of economists are trying to do. Professor Sharfman's abilities are of a high order. He organizes effectively and writes forcefully. But he has failed, in the reviewer's opinion, to devote thought enough to some of the most complicated and difficult of the problems to be solved and he has, on that account, failed to note some of the significant probable consequences of his proposed policies.

HARRY GUNNISON BROWN.

UNIVERSITY OF MISSOURI.

NOTES AND MEMORANDA

THE CHIEF PROBLEM OF ECONOMIC THEORY[1]

IN the May issue of this Journal Professor Kleene published a review of my *Grundsätze der Volkswirtschaftslehre.* It is not my intention to inquire whether it does justice to my several theories or to these theories considered as a complete system. I wish to call the attention of American economists to certain problems from which I started and which receive rather too brief treatment in the reviewer's presentation. These problems and points of view are very different from those hitherto customary and, in my opinion, much more in accord with the actual relations of economic life. Moreover, Professor Kleene's review is typical of the difficulty, which the older German economists also share, of shifting from the traditional point of view to that of my theories. For American economists this difficulty is still greater. Unfortunately since the war I have been quite unable to follow American theoretical literature as thoroly as formerly; but as far as I can determine, the ordinary way of treating our subject —I call it politico-economic, because it stresses national wealth, or technical-economic, because it has for its point of departure supplies of goods and their production — is even more firmly intrenched there than in Germany. I attacked the imputation theory for the first time in 1908 in my article *Ertrag und Einkommen,* which I was able to submit to a number of American economists during my visit to that country, and subsequently I replaced it by my price and income theory. Since then nobody in Germany has ventured to defend the imputation theory, even tho the opponents of my theory have nothing to offer in its place. Even so convinced a supporter of the classical theory as Diehl, who in 1908 in a review of my article declared that "an explanation of interest will still be possible only on the basis of the idea of the productivity of capital," is now turning away from this conception.

---

[1] Translated by A. E. Monroe.

For Professor Kleene, however, the imputation theory is still axiomatic. And that theory is an absolute necessity, if one still reasons on the basis of value theory and believes in the possibility of deriving the value of production goods from the value of consumption goods. Not until one gives up the whole value concept — and in the arguments of Professor Kleene it still plays a most mischievous part — does one recognize that production goods are costs, have no "value," but yield merely prices, which are explained by my price theory; not till then does one recognize also that every imputation of value is superfluous — a fiction. Schumpeter says that practical life solves the problem of value imputation and so it must be soluble in theory also. A characteristic error of the traditional theory! In practical life there are only prices of cost goods; these are never an expression of value and are to be explained only by the theory of prices.

The situation is quite the same in the other sphere in which the imputation theory plays a part — in the explanation of the shares of income which are to be imputed to the contributing factors of production, whether within an undertaking or in the whole economic structure. Only because Professor Kleene does not recognize that all incomes are prices or made up of prices, and that even interest is nothing but a price, can he claim that according to my theory the existence and rate of interest remains a riddle. A riddle only for him who cannot free himself from the idea of an imputation to the various factors of production and from all the errors connected with it.

The chief problem of economic theory then is: can the organization of exchange be explained by a theory of distribution and imputation, or is the formation of income to be explained only by a theory of prices? This question, however, leads to a still more general one: are the principal concepts of economic science—price and income—to be treated as stocks of goods or as price expressions? The former is the traditional method, which I therefore call materialistic. It was the necessary result of basing the science on national wealth and of the economic point of view involved therein. Only a stock of goods could be considered national income, and so prices and all economic concepts were also regarded as stocks of goods. This conception received its most consistent application in America in the system of Clark. Schumpeter followed him. The latter, however, has turned more and more from it of late, because the problems of money cannot be explained in this way.

In reality, however, all problems of economic theory are money problems, and an analysis of the relations of quantities of goods, instead of a price and income theory based on money, is impossible. It is not possible to explain the distribution of wealth as a simple movement of quantities of goods, because this distribution is assumed by the money mechanism, and because important effects on the distribution of wealth can result from the side of money, which today is of such cardinal importance, at least in Germany.

To replace the concept of the money mechanism of exchange by a theory of imputation is impossible, however, for two reasons.

(1) First, the causal sequence in the attainment of money yields [*Erträge*] is just the reverse of that in the attainment of production. Every imputation, however considered, must in the last analysis be based on the fact that products are derived from production goods — land, tools, labor. Money yields, however, are never derived from production goods, causally are not traceable to them. Here the causal sequence is the reverse: only with a view to the money yields and to the consumers' valuations of goods behind those yields are production goods provided at all. Cloth is produced by the loom, it is true, but valuations of the finished cloth are first the cause of the loom, the reason why costs were expended on the loom. And they are expended on it only up to the point where the weaver recovers, besides all other costs, a certain money yield. It is from this striving for money yield, which again results from the price of the finished cloth, that the

price of the loom is to be explained and in my theory is explained; not by any imputation.

(2) The second reason why an imputation to production factors is impossible is closely connected with the first. Yields and incomes — whether considered as sums of money or stocks of goods — are not at all in proportion to the production factors or to the service, are no remuneration for the special service. This idea of a remuneration also is a constant error in the traditional theory, which is inseparably involved with imputation and appears typically in Böhm-Bawerk and Clark. One wage, however, is not high because the work is difficult, another lower because the work is easier or shorter. One profit is not higher because more capital was used, another lower because less capital was used. The high wage is high because the supply of the services in relation to the demand is small, the other is low because a large supply finds only a relatively small demand. Therefore income shares are to be explained only as an aspect of price determination, and are so explained by me.

Of all this the reader learns nothing from Professor Kleene's review. With respect to my rejection of the imputation theory he refers only to the incidental remark quoted from my pupil Mohrmann that not bow plus arrow equals bird, but bow times arrow, and therefore one cannot impute part of the product to any one factor. But this idea of an equation is also completely contrary to my views. It is not a question of any kind of equalization — all equating in economic theory is absurd, at least it can explain nothing — but of a comparison of utility and cost, in which the cost expenditures are determined by the expected utility.

Because of the entirely different causal sequence the investigation of monetary phenomena cannot be replaced by one of the technical relations between production goods and products, nor can their explanation result from an imputation to factors of production. Professor Kleene remarks that "a formulation of economic theory in terms of money prices rather than in terms of value and of quantities of goods has some pedagogical advantages." Professor Kleene is scarcely aware what astonishment this peculiar opinion must arouse not only in me but in many German economists who, as a result of the experiences of economic life, have long since progressed beyond this stage of economic theory. To be sure, the so-called national wealth, an imaginary magnitude with which economic theory is not concerned, consists of goods; but the problems of exchange and of taxation are money problems.

It is thoroly erroneous, therefore, when Professor Kleene says "to the seasoned theorist there is a gain in stripping off the monetary side of economic phenomena to get at fundamental factors, to think in terms of value rather than of price." The fundamental factors of economic life are not stocks of wares and instruments of production, but are of a psychological order — wants and comparisons between utility and costs, which in these days of sharp separation between the economics of consumption and acquisition also find their point of departure in money. For this view of economic life, however, nothing is more dangerous and confusing than the "value" concept, which in Professor Kleene's argument against my theory plays the principal rôle. On this point also, I believe, progress has been made in Germany. With the exception of entirely unprogressive theorists, to whom nobody pays attention, nobody in Germany now ventures to speak of exchange value and the like. As a matter of fact there is no exchange value, there is nothing in economic life except prices, obtained and estimated prices. (The price estimating of durable cost goods, the so-called capitalization, is thoroly discussed in my *Grundsätzen.*) A theory has all the greater claim to truth the less it uses figments which are not met in economic life. Therefore nothing will ever come of this "thinking in terms of value."

In this connection reference may be made to Professor Kleene's curious remark that my theory is one "of comparative price only, that is of value. . . . To make it a complete theory of prices, it needs to be supplemented by a theory of general price level." The "general price level" is also one of the most confusing and erroneous notions in economic theory.

The measurement of it has a certain interest for statisticians; but one can recognize the movement of prices and their causes only by considering the effects of supply or demand on particular prices, not by computing an average price level. Thanks to my continued controversy against it and to the things which we unfortunately have had to witness in German economic life, the concept of an average price level plays little or no part in discussions of present-day price problems in Germany, and Professor Kleene's admonition that other German economists and I should not so confuse the problems of the price level has rather missed the mark.

Professor Kleene says with respect to the question whether there be monetary problems or those of stocks of goods, "if he had been less fascinated by it (the money veil), he might not have overlooked so completely certain important problems." For example, he says, there is nothing in the two bulky volumes about the character of capitalistic production or about the rôle of capitalists in the increase or maintenance of the apparatus of production. There, it seems to me, my critic again allowed himself to be influenced too much by his traditional materialistic point of view. For capitalistic economy is not characterized by the utilization of production goods simply —in that case there would never have been a non-capitalistic period — but, as Marx has already pointed out, tho with a bias, by the fact that the production goods are translated into the money form, are estimated in money terms. And so the question "of the part played by capitalists in increasing or maintaining our productive apparatus" is one of money economy. Production goods are bought with money, and the problem of capital creation is: to what extent and on what production goods is money, i. e., income shares, expended. Professor Kleene's assertion that there is nothing on this question in my book is very strange. For in Part 10 there is a very thoro discussion, under the very title of Capital Formation. Perhaps, however, he did not find it "worth the effort" to read so far. There I have developed theories about the connection between capital formation and consumption and in addition about the problem of crises, which are unquestionably new and which have since been much quoted and discussed in Germany. Why Professor Kleene passes them over in silence I do not know.

It is true my book contains no solution of the imaginary problem raised by Böhm-Bawerk and the materialistic theory, which maintains that interest can be explained by imputation to the material production goods, i. e., by a "productivity of capital." But my work does give a thoro demonstration of the reason why this is an imaginary problem: because of the confusion of the technical with the economic causal sequence, in short because of the erroneous technical-materialistic conception of economics. Money yield does not arise from the factors of production of any kind, as products may be said to come from the earth, but the reverse: the yield, the prospect of it, is the first occasion for the utilization of production goods, whether labor, goods including land, or money. (Here also is the reason why I include land in capital, under certain conditions — not in itself, for no production good is capital in itself — which Kleene mentions as a curiosity.)

Yield is not a problem of economics at all, but a presupposition, since all economic activity consists in obtaining an excess of utility over cost. And so it is just as erroneous to trace interest causally back to so-called capital goods as it is to trace the wage of the worker to the work or the money yield of the farmer or tenant to the land. The economic causal sequence is the reverse of the technical. In the former, production goods are costs, and, in whatever form, are provided and utilized only in the expectation of a yield. The theoretically accurate formulation of this is the "law of the equalization of marginal yields." The reasons for this I cannot discuss further here.

I am aware it will be a long time before this difference between the technical and the causal sequence is generally recognized in all its consequences for economic theory. But deeper insight into the whole organization of exchange, the exposure of such imaginary problems as those connected with the materialistic concept of capital and the theory of imputation, the feasibility of explaining present-day problems of price change and the like, are so fundamental that their superior importance can hardly be denied, once they are understood. This is troublesome, to be sure, for the supporters of the older point of view, who cannot free themselves from their traditions and adopt the very different attitude which my theory requires. Professor Kleene's review is evidence of this. I can say today, however, on the basis of the adherence which this theory has secured in Germany, Switzerland, Holland, and Japan, that it will make its way. For above all, it is much more realistic than the traditional attitude. I had hoped that there might be persons who would appreciate its basic idea in the United States also, where, next to Germany, there is the greatest interest in economic theory, altho I knew that the materialistic theory had taken deep root there. Professor Kleene's article is the first I have seen from this quarter. I do not believe that all American economists will hold to his position. I have therefore taken the liberty of calling attention to some of the fundamental problems which have led me to work out my opinions.

ROBERT LIEFMANN.

FREIBURG, GERMANY.

THE EARLY USE OF THE TERM INDUSTRIAL REVOLUTION

Some interest attaches to the date when the two words "industrial revolution" were first used to describe the industrial changes of the end of the eighteenth and the first quarter of the nineteenth centuries. Did the term originate with the historians of the great period of transition or with the early socialist writers?

Mantoux was satisfied to consider Arnold Toynbee as father of the term.[1] Wood thought it "not unfair" to follow Toynbee in crediting authorship.[2] As late as 1910, then, writers were saying that the use of the term dated from about 1884. In 1914, Professor Rappard pointed out some earlier uses, notably that by Karl Marx in *Das Kapital* in 1867, and the rather general use by John Stuart Mill in the first edition of his *Principles* in 1848.[3] For some reason, Professor Rappard seems to infer that Marx heard the words in conversation with Engels.[4] He concludes by naming 1845 as the date of the first printed form of the term and Engels as the accredited user.[5] While Professor Rappard thus ascribes the term to the socialist writers, not merely in origin but in popularization, he hints at the possibility that it may be found in the writings of the first half of the century.

The student of French industrial history finds in the two words, which describe fifty years of Europe and thirty of America, a very natural association with the political changes of the French Revolution and the rapid industrial changes. My interest in the origin of the term arose from reading the debates of the French Chamber of Deputies. *Le Moniteur*

---

[1] Mantoux, Paul, "Le mot est, croyons nous, d'Arnold Toynbee." La révolution industrielle au XVIII^{e} siécle, 1905, p. 1, note.

[2] Wood, Henry T., Industrial England in the Middle of the Eighteenth Century, 1910.

[3] Mill, J. S., Principles of Political Economy, 1848, p. 581.

[4] Rappard, W. E., La révolution industrielle, 1914, p. 4.

[5] Ibid., p. 4.

Universel of August 17, 1827 reprinted an article from the *Journal des Artistes.* In the center of the page in italics were the words "Grande Révolution Industrielle." The article is an important one. It is significant that the term is there used technically to describe the change in arts, manufactures and social institutions. The author sets out to examine "jusqu'à quel point les arts ont pu exercer leur influence dans cette grande révolution industrielle."[6] With considerably less prominence the term was used June 22, 1829 by Prosper de Launay. A speech of his was preceded by a long discussion of the marked changes in local industry, and there the attention of the legislators was called to the displacement of the linen industry in northern France, not alone by the cotton industry, as is so frequently stated, but by the beet sugar industry which had replaced the culture of flax. He says "Le département que j'ai l'honneur de représenter a été plus qu'aucun autre victime de cette révolution industrielle; sa fabrication, considérable il y a vingt ans, n'existe plus aujourd'hui."[7] Launay had adequate precedent for his use. Chaptal had suggested that some of the inactivity of the linen industry was due to a decrease in religious attendance, accompanied by lessened emphasis upon pomp and luxury in the church service. The paragraph introducing this comment reads: "D'autres causes peuvent encore produire des révolutions dans l'industrie."[8]

Similar quotations may be given from the works of early French geographers and historians. Guilbert's *History of the Cities of France* was well known in his time. He writes, "L'ère des révolutions industrielles avait commencé pour la ville de Rouen avant l'ère des révolutions politiques."[9] In one case he applies the term, as did a few other writers, to the commercial changes of the sixteenth and seventeenth centuries. In a description of Lyons (written 1844) occurs this sentence, "Le XVII^e siècle vit s'opérer cette révolution industrielle."[1] His use is more fortunate a few pages further on, when he points out that the Jacquard loom had to struggle against routine and despite the protection of Napoleon was not adopted until 1812 when "elle opéra une veritable révolution dans la fabrique."[2, 3]

---

[6] Le Moniteur Universel, August 15, 1827, p. 1202.

[7] Ibid., June 22, 1829, p. 1090.

[8] Chaptal, De l'industrie Française (1819), vol. ii, p. 231.

[9] Guilbert, Histoire des villes de France (1847), vol. v, p. 487.

Sometimes the change in manufactures is distinguished from the change in commerce — as "Les révolutions religieuses, politiques et industrielles."[4] Comte would have included the significant broadening of ideas as a "révolution morale."[5]

Marx and Engels were therefore taking advantage of a formula in general use in France and adjoining countries in the early twenties — a formula which did not cease to be used throughout the sixties and seventies.[6] Picard attempts to date the revolution in England by events in France. Translated freely his statement is: at the time when France finished her political revolution, a "révolution industrielle" had come in England by the use of steam as the principal power for manufacture and by prodigious improvement in machines to spin cotton.[7] The same writer dates the revolution in France from 1815 to 1830.[8]

Since my study covers intensively only the years 1820–40, I have not attempted to determine the usage earlier than the twenties. Darnis in 1844, writing of the expositions, makes a reference to the early period of some interest. He would seem to suggest that the idea of associating the change in industry with the political changes brought about by the Revolution came very early. It dates in his opinion from the time of the

---

1. Guilbert, Histoire des villes de France (1844), vol. i, p. 392.

2. Ibid., p. 398.

3. The famous Bowring report refers to the Jacquard loom as "quietly revolutionising the trade both of St. Etienne and Lyons." Br. Parl. papers, 1835, vol. xxxvi, p. 45.

4. Guilbert, vol. i, p. 398.

5. Comte, Système de politique positive, Paris, 1824, p. 69.

6. Legrand uses the term as follows: "On vous a dit que les chemins de fer produiraient une révolution commerciale et industrielle." Arch. Parl., June 19, 1837, vol. 113, p. 29.

7. Picard, St. Quentin (1867), vol. ii, p. 6.

8. Ibid., p. 121. "De 1815 a 1830, la France devint de plus en plus une nation industrielle et l'un des résultats de cette révolution économique fut de donner à la classe laborieuse une importance toute nouvelle."

first exposition in 1798. This exposition was planned to celebrate the anniversary of a revolution which had proclaimed freedom of work and opened new pathways to the genius of man. After the campaign in Italy, many were looking about for a fitting plan of a national celebration of the anniversary of the Republic. Some suggested a fair, others a horse race, still others an exposition of painting, sculpture and engraving. François de Neufchateau, Minister of the Interior, in a speech at the Champ de Mars suggested an industrial exposition. The idea, Darnis assures us, was received with much enthusiasm.[9] In this same year Bonaparte placed the designation "Member of the Institute" before his title of General. Was this a recognition of the importance of industry? It was so meant. The Minister of the Interior considered the first exposition — a really feeble affair — the initial step in a campaign disastrous to English industry. He is quoted as having written to the Departments "nos manufactures sont les arsenaux d'où doivent sortir les armes les plus funestes à la puissance britannique." [1]

One need not read beyond Chaptal to find a carefully quoted use of the word "révolution" in 1806, to describe the change going on in industry. Before 1790 all the manufacturers of Elboeuf had made one kind of woolens, at a uniform price. Moreover, so long as yarn was uneven it was impossible to dye merinos in lighter shades. Better spinning and dyeing made possible a great variety of fabrics. On December 27, 1806, the Chamber of Elbœuf proposed regulating the style and types of goods, tho they recognized that "cette révolution a été utile à l'industrie."[2] Chaptal refers to the transition in similar terms: "Les machines qui remplacent aujourd'hui la main de l'homme dans presque toutes les opérations de l'industrie manufacturière ont opéré une grande révolution dans les arts." [3]

It is certain that the comparison of the industrial changes with the political changes of the revolution was specifically made many times later. Nothing could be more concrete than the words employed in a tariff discussion in the Chamber of Deputies in 1836. Lamartine says, "c'est une révolution tout entière, c'est le 1789 du commerce et de l'industrie." [4] To Bulwer the rush of new opinions was most stirring. He felt that "the spirit and intellect of the country received a fresh birth, and at the same time a fresh race was born — a race that had neither the ideas, the wants nor the history of its predecessors. This was the *real revolution*." [5] In fact the far-reaching effect of the French revolution upon social and industrial life was a favorite theme of philosophers from the time of Condorcet.[6] Comte, the pupil of St. Simon, could not, as he did not, neglect to stress its significance.

---

[9] Annuaire de l'economie politique, Paris, 1844, p. 220.

[1] Ibid., pp. 222, 223.

[2] Chaptal, vol. ii, p. 289.

[3] Ibid., p. 29.

Writers use the term revolution to describe any marked change in the conduct of an industry, whether it was "l'invention de la machine à vapeur qui opère une révolution dans les procédés de l'industrie et dans le système de la navigation," [7] or the use of steam in navigation which ought to produce "une véritable révolution dans les relations sociales." [8] In 1810 the introduction of carding and spinning in the arrondissement of Vire reduced the number of workers employed on these operations by more than three-fourths. These mechanical changes brought about "une révolution générale dans le cardage et la filature de la laine." [9] In the same valley the paper industry "a subi toute une révolution par l'introduction des mécaniques à papier."[1] For the wine industry, Pataille speaking on the budget July 15, 1829 feared the vineyards on the hills would be displaced and forced into the river valley. He refers to such a possible change as "cette grande révolution." [2]

---

[4] Arch. Parl., April 14, 1836, p. 48.

[5] Bulwer, France, Social, Literary, Political (1834), vol. ii, p. 39.

[6] Note his famous contrast in 1804 of the social effects of the American and French revolutions. Condorcet, De l'Esprit Humain, p. 28.

[7] Report on mines by Count d'Argout, Arch. Parl., March 31, 1837, p. 262.

[8] Arch. Parl., May 12, 1835, p. 705.

[9] Annuaire Normand, 1837, p. 185.

[1] Ibid., 1849, p. 357.

[2] Le Moniteur Universel, July 15, 1829, p. 1272.

In the early part of the nineteenth century, France led the world in the application of chemical science to industry. Scientists were retained as technical officials in many comparatively small plants. Berthollet credited the great progress in French manufactures to the technical knowledge of experts who directed the practice of artisans. He wrote: "Une heureuse révolution s'est opérée à cet égard parmi nous; ce n'est plus à des ouvriers ignorans que sont confiées nos fabriques; on trouve dans la plupart des hommes très-éclairés, des physiciens très-instruits, et c'est à eux qu'il faut s'adresser si l'on vent provoquer les progrès des arts utiles." [3] The brilliant discovery of the Prussian chemist Margraaf, who found sugar crystals in the fiber of beets, was heralded as having made "une révolution dans les rapports commerciaux des deux mondes." [4] J. B. Say had referred to foreign commerce, which "a subi une nouvelle révolution par l'invention des machines à filer le coton." [5] The changes in the sugar industry fascinated contemporary writers. It would be easy to give numerous quotations of extravagant statements concerning the effect of the growth of sugar beets as well as of the process of refining. The domestic sugar industry modified colonial policy, affected agriculturists, interested shippers, to say nothing of the group of refiners who clamored for protection or the consumers who now and then had an advocate for no protection. Especially notable was the increase in the consumption of sugar. Speaking on this subject one of the deputies vividly set forth what would have been the astonishment of Louis XIV had he known the amounts of imports of cotton, sugar, and tea into England and France. The deputy added "c'est une révolution véritable dans les consommations du monde." [6]

More important than the date of use is the meaning attached to the term. One must not take too seriously the actual changes which led to the large phrases of enthusiasts.

---

[3] Berthollet, C. L. and A. B., Elements de l'art de la Teinture, 2d edition, 1804, Introd.

[4] Arch. Parl., July 6, 1837, p. 43.

[5] Say, J. B., Cours complet d'economie politique, Ed. II, p. 406.

[6] Arch. Parl., March 23, 1837, p. 567.

Apparently French industry could withstand a great deal of "révolution." The best estimate at the end of the twenties gives only 29 per cent of the working population of the Midi engaged in industry, and even in the north of France but 38 per cent.[7] And quotations compiled in a scrappy way do not do justice to the authors cited. French writers knew that their country was too short of investment capital to develop large-scale industry rapidly. Discussion of the real significance of the term must be part of a description of the industry of the period. To that I hope to turn as the conclusion to a study of which this is in some sort an introduction.

ANNA BEZANSON.

UNIVERSITY OF PENNSYLVANIA.

---

[7] Dupin, Forces productives et commerciales de la France, 1827, vol. ii, p. 260.

A CRISIS IN DEPOSIT GUARANTY IN THE STATE OF WASHINGTON

In a recent issue of this Journal Mr. Thornton Cooke pointed out the danger confronting the Nebraska fund for the guaranty of bank deposits, because of the comparatively small reserve and the large amount at risk in certain large banks. The state of Washington at the present time furnishes an extreme illustration of the danger involved in the unscientific concentration of risk which may occur under a voluntary system of deposit guaranty. During four years following the establishment of the Washington system no failures had occurred among member banks. But on July 1, 1921 the largest bank of the system, the Scandinavian American Bank of Seattle, closed its doors. The available fund is entirely inadequate to meet the claims of depositors. While the fate of the existing system is yet undetermined, it seems probable that it will break down entirely.

In 1917 the legislature passed a voluntary deposit guaranty law. The fund, created by the original law to consist of one-half of one per cent of the average annual deposits eligible to guaranty, was not withdrawn from the banks but was simply charged to the guaranty fund on the books of the bank. It was not charged, however, against the income of the year when credited, nor was there any statutory provision for amortizing this expense over a period of years. As will be shown later, this means a very heavy concentration of expense in any year when losses necessitate an assessment upon the fund. In order to secure payment of assessments the 1917 law required member banks to deposit securities in trust with the Guaranty Fund Board amounting to one per cent of the eligible deposits.

During the 1921 session of the legislature some important changes were made. The guaranty fund, so-called, was increased to one per cent of eligible deposits but remained merely a book transaction between the member bank and the

Board. The deposited securities were returned to member banks. Assessments against the guaranty fund constituted a first lien against the assets of the member banks. A second fund was created known as the contingent fund, to be accumulated by annual assessments not to exceed one-tenth of one per cent of average deposits in the member banks. Actual cash payments of this amount were to be made to the Guaranty Fund Board. The expenses of the Board — a nominal amount, since no salaries are paid — were to be drawn from this fund. Income derived from the investment of the contingent fund was to accrue to the benefit thereof. It was hoped by the 1921 amendments to build up a more substantial fund than could be accumulated under the original law. It is clear, however, that at the rate of one-tenth of one per cent per year, thirty years would be required to accumulate a three per cent fund if no losses occurred and if the income from investments equaled the expenses of the Board.

The report of the Bank Commissioner covering the year 1920 contains the last published statement of the guaranty fund banks, as of November 15, 1920. At that time 116 banks and 4 branch banks were members of the guaranty fund. The law provides that public deposits may be secured either under the guaranty fund or by the deposit of collateral or surety bonds. It is not possible, therefore, from the published statement to determine the exact amount of eligible deposits in the member banks. Roughly it amounted to $65,000,000. The amount credited to the Guaranty Fund Board was $320,908, presumably one-half of one per cent of the eligible deposits at the time of last adjustment of the fund.[1] With two outstanding exceptions the members of the system were relatively small banks. The largest bank in the system was the Scandinavian American Bank of Seattle with total deposits November 15, 1920 of $15,834,624. The Spokane and Eastern Trust Company of Spokane, with deposits of $11,399,486, was the only other bank having deposits of over two millions.[2]

---

[1] Fourteenth Annual Report of the Bank Commission, p. 25.

[2] Fourteenth Annual Report of the Bank Commission, pp. 37–51.

The failure of the Scandinavian American Bank of Seattle, which occurred July 1, 1921, was the result of overexpansion of loans during the administration of a former president; the failure of the Scandinavian American Bank of Tacoma in January, 1921, a bank which had originally been established as a branch of the Seattle bank and which had been closely affiliated with it until recent years; and the depreciation of assets due to the general shrinkage of property values. Early in 1920 a new administration having the full confidence of banking and business interests was placed in control. An earnest effort was made to clear up the doubtful assets of the bank and improve its financial position. Under the direction of the Federal Reserve Bank of San Francisco, of which the Scandinavian American Bank of Seattle was a member, and of the state banking department, an assessment of 100 per cent was levied upon the stockholders, bringing in $1,000,000 in cash. Under the adverse financial condition prevailing these strenuous efforts proved unavailing. Still further endeavors at rehabilitation were then made, one of which involved postponement of part of their claims by the larger depositors (over $100 each) and failed because of their unwillingness to accede.

During the time when it seemed possible to effect some plan of reorganization the Guaranty Board postponed levying an assessment upon the member banks. Finally the Board felt that a call must be made immediately for the payments for the benefit of the guaranty fund. On December 7, an assessment of one-half of one per cent, the maximum amount which banks may be assessed per annum, was levied. At the same time the member banks were asked to turn over the one per cent already credited to the fund upon their own books. In other words, banks were asked to pay at once 1½ per cent on their eligible deposits.

There was available in the guaranty fund about $500,000. A levy of one-tenth of one per cent had been made earlier for the contingent fund, which should add about $40,000 to $50,000 more; the one-half of one per cent assessment may be expected to bring in about a quarter of a million. A large proportion of this total of about three-fourths of a million, as the writer learns from the officials has been collected in cash by the Secretary of the Guaranty Fund Board.

The burden of this levy upon the member banks can only be realized when it is recalled that the fund had never been charged against income in previous years, except by a very few banks. The result is that 1½ per cent of the deposits must be withdrawn from the current year's income. In the typical bank, deposits are approximately ten times capital. Accordingly this levy is equivalent to about fifteen per cent upon the capital stock of member banks. Some of these banks, especially in the agricultural districts, are already hard pressed by the adverse financial conditions. To them the new load becomes almost unbearable.

The law contains a section providing for voluntary withdrawal of member banks. In order to avoid the burden of further assessments, banks have been flocking out of the system in recent weeks. The second largest bank of the system — the Spokane and Eastern Trust Company — had filed notice of withdrawal in March, 1921; but during the period when reorganization of the Scandinavian American seemed possible, there were few withdrawals. When that failed, there appears to have been a concerted movement to get out. It was announced on December 30 that all but seven of the 120 banks had withdrawn.

The liability of the withdrawing banks for further assessments can only be determined when the Supreme Court of the state makes its interpretation of the law. The language of the pertinent section does not make it clear whether banks can be required to pay assessments beyond one year from date of their withdrawal. The opinion of some who were instrumental in drafting the law is that the intent of the legislators was to make member banks fully liable for losses due to failures occurring while they retained membership in the fund. On the other hand, others in an equally good position to know maintain that a limited liability was certainly contemplated, and that there was no intention to hold a member bank liable for an indefinite number of annual assessments after it had withdrawn. The decision of the court cannot be given for months, possibly years.

Meantime the special deputy supervisor in charge of liquidating the defunct bank is making collections upon loans and other assets and turning the proceeds over to the treasurer of the guaranty fund. Under date of December 19, 1921 a letter was sent to all creditors of the bank enclosing warrants for the full amount of the approved claims. There was also a check for twenty per cent of the warrant signed by the secretary of the guaranty fund. The amount of this dividend is endorsed upon the warrant. Under the terms of the law warrants should bear interest at the rate of five per cent per annum from date until redeemed, but the warrants which have been issued do not contain any interest clause.

Guaranteed claims have been approved amounting to $7,889,770. The book value of assets on December 19, was $9,890,624, but it is impossible to say at this time what can be realized upon them. Unpaid assessments upon capital stock amounted to $991,347, part of which, or all, may prove uncollectible. Action has been brought against some stockholders for their unpaid assessments.[3] Suits are also pending on many of the slow loans. A committee of Seattle bankers made a careful appraisal of the assets of the Scandinavian American at the time of closing, and reported as follows:

A. Reasonable banking assets	$6,409,773.38
B. Assets which, while too slow to classify as desirable bank resources, would still prove collectible	2,325,482.71
C. Assets of doubtful collectibility	3,043,801.14
D. Assets which seem probably bad	1,855,321.70

It was conceded that there would be substantial recoveries in class C.

It will be long before the final settlement is effected. Present indications are that the existing system of deposit guaranty is at an end, as member banks have practically all withdrawn and the heavy losses entailed by the experience make it doubtful whether a voluntary system can ever succeed in Washington.

---

[3] Stockholders have refused to pay on the ground that they were assessed 100 per cent in 1920. On December 30, 1921, Judge J. T. Ronald of the Superior Court of King County rendered a decision to the effect that they are liable for another 100 per cent assessment on their stock. An appeal to the Supreme Court is anticipated before actual payments are made.

The fate of the depositors is also undetermined. There is a considerable feeling that the state, by allowing the member banks to advertise their deposits as guaranteed, assumed a moral, altho not legal, obligation to see that they are paid in full. The deposits of the Scandinavian American were primarily savings accounts. Approximately 21,000 depositors had claims against the institution when it failed. Of these only a negligible number were in a position to recover by offsetting deposits against loans made to the bank. A few who would otherwise have had the right to offset lost it because their paper had been rediscounted with the Federal Reserve Bank. Of the $2,304,000 of rediscounts at the time of failure, only $8,787 remained uncollected December 19, 1921. Altho the depositors have not been benefited by these collections, it is evident that the losses to the Federal Reserve Bank will be negligible.

An interesting by-product of this failure was a great increase in postal savings deposits. It was officially reported that $1,302,070 was added to the postal savings at the Seattle Post Office during July. On the whole, however, confidence in the banks of the community was not seriously impaired.

The fact that deposits were guaranteed cannot be held responsible for the reckless banking which wrecked the Scandinavian American Bank. Its bad administration began years before its admission to the guaranty fund. Doubtless, however, its membership in the fund gave many depositors a false sense of security.

If the opinion of Mr. Cooke proves true that "still more states will be led by the present bank casualties to adopt the plan," the Washington situation should be studied with care to see what lessons may be learned. The guaranty principle is "insurance and nothing else."[4] As such it demands a scientific distribution of risk. Whether a feasible plan of underwriting large risks can be devised is not clear. The

---

[4] Robb, The Guaranty of Bank Deposits, p. 200.

Scandinavian American failure was the largest ever experienced in Washington. To throw the burden of its losses on about 120 small banks clearly threatened ruin to these — a possibility that should have been foreseen. That it was not foreseen is conclusive evidence that greater care must be exercised in devising state systems.

HOWARD H. PRESTON.

UNIVERSITY OF WASHINGTON,
SEATTLE, WASHINGTON.

BOOKS RECEIVED

Bastiat, Frederic. Economic Sophisms. New York: G. P. Putnam's Sons. 1922. pp. 330. $1.75. (Translated by Patrick James Stirling.)

Bouniatian, Mentor. Les Crises Economiques. Paris: Marcel Giard. 1922. pp. 385. 25 *fr*. (Traduit du Russe par J. Bernard.)

British Association, Committee on Currency and the Gold Standard. Monetary Policy. London: P. S. King & Son. 1921. pp. 75. 2*s*. 6*d*.

Browne, Waldo R. What 's What in the Labor Movement. New York: B. W. Huebsch, Inc. 1921. pp. 577. $4.00.

Carnegie Endowment for International Peace. Proceedings of the Hague Peace Conference. Translation of Official Texts. New York: Oxford University Press. 1921. pp. 1162. (Conference of 1907. Vol. III.)

Comstock, Alzada. State Taxation of Personal Incomes. New York: Longmans, Green & Co. 1921. pp. 246. (Columbia University Studies.)

Feis, Herbert. The Settlement of Wage Disputes. New York: Macmillan Co. 1921. pp. 289. $2.25.

Friedman, Elisha M. International Finance and Its Reorganization. New York: E. P. Dutton & Co. 1921. pp. 702. $7.00.

Gamble, Sidney D. Peking: A Social Survey. New York: George H. Doran Co. 1921. pp. 538. $5.00.

Gregory, J. E. G. Tariffs: A Study in Method. London: Charles Griffin & Co. 1921. pp. 518. 25*s*.

Jones, Eliot. The Trust Problem in the United States. New York: Macmillan Co. 1921. pp. 598.

Kniffin, William H. American Banking Practice. New York: McGraw-Hill Book Co. 1921. pp. 389. $3.50.

Knight, Frank H. Risk, Uncertainty and Profit. Boston: Houghton Mifflin Co. 1921. pp. 381. $3.00.

Lee, Mabel Ping-Hua. The Economic History of China with Special Reference to Agriculture. New York: Longmans, Green & Co. 1921. pp. 461. (Columbia University Studies.)

Leith, C. K. The Economic Aspects of Geology. New York: Henry Holt & Co. 1921. pp. 457.

Lowe, Boutelle Ellsworth. The International Protection of Labor. New York: Macmillan. 1921. pp. 439.

Mitchell, Wesley C., and others of the staff of the National Bureau of Economic Research. Income in the United States. New York: Harcourt, Brace & Co. 1921. pp. 152. $1.25. (Text edition.)

Mukerjee, Radhakamal. Principles of Comparative Economics. London: P. S. King & Son. 1921. pp. 336. 15*s*.

National Industrial Conference Board. Changes in the Cost of Living. New York: The Century Co. 1921. pp. 25. 75 cents. (Research Report No. 39.)

——. Family Budgets of American Wage-Earners. New York: The Century Co. 1921. pp. 97. $1.00. (Research Report, No. 41.)

——. The Metric versus the English System of Weights and Measures. New York: The Century Co. 1921. pp. 261. (Research Report No. 42.)

Oldershaw, L. Analysis of Mill's Principles of Political Economy. Oxford: Basil Blackwell. 1921. pp. 143. 4*s*. 6*d*. (Second edition, revised.)

Orwin, C. S. Farming Costs. Oxford: Clarendon Press. 1921. pp. 141.

Roscher, Wilhelm. Economie Industrielle. (Tome II.) Paris: Marcel Giard. 1921. pp. 497. 22 *fr*. (8e edition, revue et augmentée par Wilhelm Stieda.)

Rowe, L. S. The Federal System of the Argentine Republic. Washington: Carnegie Institution. 1921. pp. 161.

Revue de Métaphysique et Morale. Problèmes Actuels de l' Economique. Paris: Colin. 20 *fr*. (A series of important papers in a special number of this Review, by March, Barone, Hawtrey, Gide, Rist and others, on Statistical Method, Exchange, Production, Consumption, Factors of Production.)

Scrugham, Mary. The Peaceable Americans of 1860–61. New York: Longmans, Green & Co. 1921. pp. 125. (Columbia University Studies.)

Sée, Henri. Esquisse d'une Histoire du Régime Agraire en Europe aux XVIIIe et XIXe Siècles. Paris: Marcel Giard. 1921. pp. 276. 15 *fr*.

Seligman, E. R. A. Essays in Taxation. New York: Macmillan. 1921. pp. 806. (Ninth edition.)

Simkhovitch, V. G. Toward the Understanding of Jesus and other Historical Essays. New York: Macmillan Co. 1922. pp. 165. (Including essays on Rome's Fall Reconsidered and on Hay and its History.)

Spencer, William H. Law and Business. (Vol. II.) Chicago: University of Chicago Press. 1921. pp. 670. $4.50 (A three-volume work.)

Taylor, F. M. Principles of Economics. New York: Ronald Press. 1921. pp. 577.

Tosdal, Harry R. Problems in Sales Management. New York: A. W. Shaw Co. 1921. pp. 637.

Turner, John Roscoe. The Ricardian Rent Theory. New York: New York University Press. 1921. pp. 221. $4.00.

Turpin, Hector. Le Problème International Du Chomage. Paris: Giard & Cie. 1921. pp. 116.

Vanlande, René. Avec le Général Niessel en Prusse et en Lithuanie. Paris: Charles-Lavauzelle & Cie. 1922. pp. 184.

Van Metre, Thurman W. Economic History of the United States. New York: Holt & Co. 1921. pp. 672. $3.25.

Woods, K. S. The Rural Industries around Oxford. Oxford: Clarendon Press. 1921. pp. 180.

THE
QUARTERLY JOURNAL
OF
ECONOMICS

MAY, 1922

INTERNATIONAL TRADE UNDER INCONVERTIBLE PAPER

SUMMARY

I. Introductory, 360. — The purchasing-power-parity doctrine; objections to it, 361. — II. The foreign exchange markets, 364. — General method; basic assumptions, 367. — The principal media of international payment, 368. — Mechanism of the exchange market; equilibrium tendencies, 369. — The formula for media of payment; for the exchange rate, 376. — The short-run par of exchange under paper, 379. — III. The commodity markets, 383. — The relations between prices of media of payment and of commodities, 385. — The formula for exports and imports; nature of the equilibrium tendencies, 389. — Changes in the volume of commodity movements, 392. — Mechanism of the exchange and commodity markets in a specific case of disturbance, 394. — Summary of results to this point, 398. — IV. Long-run aspects, 399. — Long-run results of the specific disturbance previously examined, 400. — Relations between domestic and international prices, 404. — The business cycle, 408. — The paper par of exchange, 410. — Conclusion, 411.

I

THE outstanding difference between international trade under the gold standard and under inconvertible paper lies in the comparative instability of the foreign exchange mechanism under a paper régime. Where gold is the basis of the monetary systems in the trading countries a single fixed parity, determined by the numerical ratio between the physical weights of the units of the various currencies, is definitely established; there is a universally acceptable medium of exchange and standard of value; and a positive mechanism develops, which tends always to prevent any very wide fluctuations of the exchange rates. Under inconvertible paper, on the other hand, there is no permanent parity, no mechanism which will necessarily and invariably correct movements of the exchanges. Large variations, both in exchange rates and in international prices, therefore become possible. Gold will of course move between countries, but only as a commodity: it cannot enter the legal tender currency, and the stabilizing effect of the gold flow mechanism is absent.

Nevertheless the general mechanisms of international trade, presumably appearing under paper, and the nature of the relationships prevailing between international trade and more purely domestic phenomena, are in many respects closely analogous to the conditions characteristic of trade under gold. The purpose of this paper is to attempt an examination of these mechanisms and relationships; an examination, it may be added, which proceeds from the view that the monetary situation presented by the existence of inconvertible paper as the basis of the monetary system is not necessarily a mere transition stage between the temporary surrender of the gold standard and an ultimate return to that standard, but may itself be a normal and permanent condition. It may also be remarked that the situation created by this abstraction of gold, while at first glance somewhat unreal, is in point of fact similar in many respects to that actually prevailing in Europe from 1914 to 1919, altho no direct investigation of this latter situation can be attempted here.

Recent discussions relevant to the problem of international trade under paper fall into three main groups.

The first includes the incidental and rather summary treatments presented in various general works on international trade or on monetary theory, and may be passed by without further notice here. Despite their many profitable suggestions and interesting points of view, no systematic treatment of the problem as a whole is attempted in any one of them.[1] The second has to do with the question of the trade between an inconvertible paper and a gold standard country; and while the resulting data and conclusions, especially those dealing with relative price movements, are important and valuable for the light they cast on our problem this group of writings, as a whole, does not concern us directly: it is occupied with a related but different question.[2] Like the first group, it may be neglected here except for incidental reference later. Finally, there remains the body of discussion centering around the purchasing-power-parity doctrine. This doctrine, and the controversy to which it has given rise, presents the only important systematic attempt that has heretofore been made to solve the problem of foreign trade under the rigid paper hypothesis, and it therefore requires somewhat more detailed attention.

The doctrine was first advanced by the Swedish economist Cassel, in the *Economic Journal* for 1916, and was elaborated by him in subsequent years. It has gained wide tho by no means unanimous support, both in Europe and in this country. Cassel's earlier and more tentative statement was somewhat as follows. The rate of exchange is primarily an expression for the value, in the money of one country, put upon the money of another country.[3] Hence the rate of exchange is determined by the quotient of the general levels of prices in the two countries; and if the quantity theory of money be accepted, as it is by Cassel, this means that the rate is determined by the relative quantities of the respective circulating media. From this it follows, finally, that the rate is "governed essentially by the degree of inflation in the different monetary systems. All other factors, such as the balance of trade and the confidence of the world in this or that country, have only a quite secondary and temporary importance."[4] In 1918, Cassel elaborated this idea, and declared that "the rate of exchange is primarily determined by the purchasing powers against goods, of the money of each country. . . . At every moment the real parity between two countries is represented by this quotient in the one country and the other."[5] This parity is the "purchasing-power-parity."

---

[1] The reader is referred especially to M. Bourguin, La Mesure de la Valeur (Paris, 1890), pp. 177 and following, for a brief but illuminating discussion of the parity of exchange under paper; and to R. G. Hawtrey, Currency and Credit (London, 1919), for a novel and suggestive approach to the general monetary aspects of international trade.

[2] The problem was first considered deductively by Professor Taussig in the Quarterly Journal of Economics for May, 1917, and later by Professor Hollander. A successful attempt to verify Professor Taussig's theoretical conclusions has recently been made by Dr. Graham (F. D. Graham, International Trade of the United States, 1862–79. Unpublished Ph.D. thesis, dated 1919, now in the Harvard University Library). Graham drew much of his statistical material from W. C. Mitchell's History of the Greenbacks (Chicago, 1903). See also J. H. Williams, Argentine International Trade (Cambridge, 1920).

Later he qualified this view somewhat,[6] and found that altho a permanent deviation from the parity will arise only from a change in general price levels, temporary deviations can nevertheless occur. Such deviations may be due to restrictions on trade which are greater in one direction than in the other, as from tariffs, to distrust of the future of a given monetary standard, to the export of capital, to the failure of export prices to reflect the general price level closely, and so forth. But in Cassel's view these deviations will soon

[3] Economic Journal, 1916, p. 62.

[4] Ibid., pp. 64, 65.

[5] Ibid., 1918, p. 413.

[6] Annals, American Academy of Political and Social Science, May, 1920, p. 262.

be corrected, and will not affect the permanent purchasing-power-parity.

A detailed criticism of this interesting doctrine, which seems to me quite untenable, is impossible within the limits assigned to this paper. I shall simply state my objections briefly, without attempting any comprehensive proof. In the first place Cassel's qualifications, which are far more extensive now than they were in 1916, deprive the doctrine of much of its original force and novelty. Second, his rejection of the balance of trade, of loans, and of similar forces, as primary and permanent determinants of the movement of exchange rates, is hardly justifiable. Third, his neglect of money incomes — which are often themselves causes of changes in the prices of international goods, not merely dependent on such prices — is at least open to serious question. Finally, and most important of all, his reliance upon the nebulous "general price level" as the determinant of exchange rates involves an assumption true only in a static condition of trade: that the prices of international commodities and those of commodities in general move together in such close relationship that a comparison of general purchasing powers as between countries can be taken to have real significance for the purposes of international trade. But the ordinary situation is dynamic rather than static, changing rather than fixed; and the investigations of Professor Graham, Professor Williams, and others give adequate statistical support to the theoretical conclusion that in times of change international prices, as quoted in an inconvertible paper country, can and do move for many months quite without any necessarily direct and predictable relation to purely domestic prices, or to the so-called general price level.[7] Insofar as this is true, the purchasing-power-parity doctrine, which is essentially dependent on the indiscriminate jumbling-together of international and domestic prices into a composite general price level, cannot be regarded as valid during periods of transition. Domestic and international price levels, under dynamic conditions, obviously do not and cannot move in harmony, nor can the general price level accurately reflect either. Indeed, to anticipate some of the conclusions of the later discussion, exchange rates and the parity are under paper proximately determined, not by general purchasing powers or general price levels at all, but by the prices and quantities of media of international payment: the influence of purely domestic commodity prices is distinctly secondary. Furthermore, important changes may take place in domestic prices (and possibly in international prices also) without necessarily affecting the exchange rates, but all such changes will of course be reflected in the general price level, and will therefore alter the purchasing-power-parity. The latter hence fails to give a true picture of the international situation under dynamic conditions, and becomes merely misleading.

---

[7] A similar conclusion can legitimately be drawn, I think, from Mitchell, altho he does not go into this problem specifically. Op. cit., Part II, chap. 5, and especially pp. 272–275.

II

It therefore seems to me that a somewhat different method of attack on the general problem of international trade under inconvertible paper is necessary. The method proposed, which is presented in the following pages, centers around an attempt to examine the nature and the operation of the specific mechanisms actually or presumably involved. It lays no claims to completeness, and the conclusions drawn from it are to be regarded not as statements of proved or even of probable fact, but rather as suggestions for the guidance of further and more definitive investigations. Nor has any statistical verification of the particular views here advanced been attempted: I have had neither the time nor the data for an inductive study.[8] I shall begin by setting up certain assumptions, designed to remove unnecessary complexities from the analysis. They are, first, the abstraction of gold in conformity with the rigid paper hypothesis; second, trade between only two countries, A and B, with no others affecting their relations; third, fixed quantities of paper currency in each country; and fourth, fairly complete competition in and between the two countries. The qualifications which these assumptions will make logically necessary in the conclusions of the later discussion are fairly obvious, and for the sake of brevity no systematic attempt will be made to remind the reader of them at each step. They do not of themselves impair the validity of the results obtained, altho they may admittedly obscure or delay the appearance of those results.

To these assumptions must be added the further statement that the whole field of the so-called "invisible items" is deliberately avoided here as far as possible, either by the method of isolation of effects or by assigning them a negative and dependent rôle: our primary concern is with the commodity field. While the argument will necessarily lose something of the appearance of reality by this abstraction, it gains in simplicity, and it does not seem to me that its substantive results are materially altered. If one country has a balance to pay to another it may make part of its payments in the form of invisible items as distinct from commodities, but this fact, while it may either exaggerate or diminish the amount of the change in the commodity situation, will not alter its qualitative character. The dominant and determinant factor in international trade, unless it be in the case of new countries financing their economic development abroad, will of necessity continue to be commodity transactions. And even where international borrowings are the controlling influence, such borrowings are from the point of view of international trade resolvable into two processes, one of lending and one of repayment, both of which will in the absence of gold be conducted primarily in terms of goods. Finally, the major part of the transactions in the invisible items field will at some stage in their life history enter the foreign exchange market, and their *proximate* effect there will be substantially the same, for the purposes of the later analysis, as that of commodities. The lack of any attempt here to examine the mechanism of international borrowing is therefore justifiable.

---

[8] Extant statistics on the movements of war prices, for example, are as yet incomplete, and they do not make such a separation of the various kinds of prices as is essential to a study of the type here outlined.

The discussion presented in the following pages may be divided into three principal sections: first, an analysis of the proximate mechanisms and tendencies governing the foreign exchange market in the "short-time" period; second, an examination of the nature of the immediate relationships between international commodity prices and movements, and the exchange rates, in the "transitional" period; and third, a somewhat more cursory investigation of certain long-run aspects of the general problem. It is proposed to proceed primarily by the method of isolation; to make the foreign exchange market the starting point, and to trace the probable subsequent effects of an important disturbance in that market were the effects of other and later disturbances to be ignored. From this point of view the division into time periods just suggested is not as arbitrary as it may at first seem, for it is obviously permissible to separate the events in the life history of a single given disturbance into two or more phases.

In the present section we are concerned with "short-time" phenomena, and a definition of the short-time period alone is here necessary; the definition of the "transitional" and the "long-run" periods may be left for the two later sections which are given to their study. By short-time is meant a period so brief that the underlying conditions which ultimately determine the course of international trade — commodity demand and supply schedules in each country, the "invisible items" (shipping charges, permanent foreign investment, and so on), and similar forces — do not undergo any material change, and can be regarded as substantially constant. For the purposes of the analysis of short-time mechanisms immediately following, a period of a few days is long enough, and the assumption of substantial stability in this period is therefore tenable. No important change in the determinant conditions will occur in this brief time. (The question of the probable duration of that stability under the conditions of actual trade is reserved for treatment elsewhere.) It may also be observed that the foreign exchange market, which is in large measure, of course, ultimately dependent on and governed by the commodity market, has in this short-run period an independent existence prior to the commodity market. As will appear more clearly later, commodity prices proximately follow instead of determine the prices of bills.

With these assumptions and definitions as the basis, we can now turn to our first principal problem, the analysis of the mechanisms governing the operation of the foreign exchange market in a given short-time period. This analysis will deal with four questions, to be taken up in order: first, the nature of the principal media of international payment; second, the mechanism of the exchange market within any given country, and the character of the equilibrium tendencies appearing there; third, the proximate determination of the exchange rate; and fourth, the probable nature of the par of exchange under paper.

The principal media of international payment available under inconvertible paper may be arranged, in the order of the sensitivity of their movements in response to changes in the exchange rates, somewhat as follows: commodity bills, bankers' drafts, and cable transfers; short-time borrowings between banks (finance bills, etc.); those short- and long-time securities, the international movements of which are sensitive to changes in discount and exchange rates; various "international" commodities for which there is an open market (especially, under the paper hypothesis, gold in its capacity as a commodity); and so on.[9] The wider and more lasting the fluctuations of the rates, the farther into the series will their disturbing effects tend to penetrate. The prices of these media, their values in terms of the money of the one country or the other, are, of course, determined at the time they are credited to the account of the one country, and charged against the account of the other—for commodity bills, for example, at the time the banker mails the bills to the other country for collection. Once this process has been performed, the given media pass out of the exchange market proper, and do not re-enter it. They still affect the commodity market, of course, but this question belongs to another part of the discussion.

Given an exchange market in either country into which all these different media of payment enter, is it possible to establish any general relationships between the prices and quantities of the media in the short-time period, and to set up any general rule for the determination of the exchange rate? As far as any given bill or draft is concerned, the rate of exchange is obviously nothing more than the numerical ratio between the price of that bill in the money of the one country and its price in the money of the other; between the amount of money that is given for it in the country of origin and the amount of money it will command when presented for collection or payment in the other country. But what happens when a large number of such bills and drafts are being offered or demanded simultaneously? Let us begin by assuming for the moment that commodity bills and bankers' drafts are the only media of international payment being employed. The international bankers of any given country, as A, are on any given day handling two sets of bills and drafts. One consists of the bills and drafts originally drawn in B and now sent to A for collection or payment. This set, however, was subjected to a valuation process in the exchange market at some previous date; that is, its values have already been determined, with reference to the exchange rate then current, in terms of the currency of the one country and the other. Once this valuation was made it passed out of the sphere of the exchange market proper. The other set consists of the bills and drafts, originating in A, which on the given date are being presented to or by A's international bankers for purchase or sale. These bills are the ones entering into A's exchange market for the given day in question, and hence the ones governing the short-time determination of the exchange rate, so far as A alone is concerned.

---

[9] For this suggestion I am indebted to Professor Allyn A. Young of Harvard University. I owe him thanks, also, for invaluable constructive criticism throughout the paper.

Banking and commercial practice may result in either of two situations with respect to these bills. Either bankers' purchases and sales of drafts will approximately offset one another; or they will not. Under inconvertible paper the former is probably the commoner and more typical situation.[1] In that case the constant effort of the bankers will be to avoid any very large excess one way or the other. If purchases in A become materially in excess of sales, then the bankers in A will quote a rate of exchange somewhat more in A's favor. This shift, by making drafts somewhat cheaper and by making the yield of commodity bills somewhat less, will bring demand and supply in A's exchange market more nearly into harmony, while at the same time the shift in the rate will of itself, by changing the terms at which money values are translated from one currency into the other, change the total money values of commodity bills and drafts being currently purchased and sold. It will decrease that of bills, increase that of drafts, and restore the two totals to substantial equality.[2]

For any given period of short duration, say a single day or a few weeks, it then appears that as far as commodity bills and drafts are concerned (provided that the function of the bankers is, as here assumed, this offsetting of purchases against sales) the total money values in the money of A of media of payment payable to A (commodity bills) and of media chargeable against A (bankers' drafts) tend to approach equality. Any upsetting of that equality tends to be corrected by the direct action of the bankers themselves in changing the price they will give or receive; that is, in changing the exchange rate quotation. The rate of exchange, as far as this set of operations alone is concerned, then emerges as the approximate numerical ratio between the total money values, measured in A's money, that are payable to A, and the total money values, measured in B's money, that A has to remit to B.

---

[1] Of the two countries, one will usually do most of the banking business connected with foreign trade, and the other only the smaller part. And as a rule the exporters in either country will receive payment by discounting bills, instead of by collecting on drafts, to about the same extent that the importers of that country make payments by buying drafts, instead of by accepting bills; that is, the two sets of transactions will in either country alone tend to balance. The existence of a permanent inequality is probably a logical alternative rather than a condition common in actual trade.

[2] The term "total money values," used here and throughout the subsequent discussion, is designed to get around the difficulty involved in using either prices alone or quantities alone as a measure of the volume of transactions, or as an index of change. Obviously the quantity of media entering a given market (or, as below, of commodities) might be doubled, and conditions in that market be radically altered, without producing anything like an equivalent change in prices. "Total money values" may be regarded as simply the aggregate of the sums paid (or received); or if the concept of an average can be given significance here, as the product of average price times average quantity.

The same process will, of course, take place in B on the given day. Since substantially the same rate will prevail in both countries at any one time, the rate actually arrived at will be a product or resultant of market condition in *both* countries. On any given day the media of payment originating in A will tend to produce one rate, while those originating in B may tend to produce another, but telegraphic communication will prevent the existence of more than one rate at any given time. And the tendency of the total money values of media of payment chargeable against and payable to either country to approach equality will of course remain effective, with the qualification that the operation of the tendency in the one country will be somewhat modified, and retarded or accelerated, by conditions in the other. Any inequalities between supply and demand arising in either country from the adjustment of the rate will soon disappear, through the operation of the mechanism just discussed. And when the bills and drafts here considered are later presented in B for collection or payment, their total money values in B's money will also approximate equality, since the two sets of values are translated from the terms of A's money, in which they are substantially equal, to those of B's money at precisely the same rate of exchange.

These conclusions, however, have been based on the assumption that bankers' sales and purchases tended always to offset one another. If, on the contrary, they steadily fail to offset one another, then a continuous transfer of unpaid balances to meet the excess becomes necessary. But this fact does not upset the validity of the argument above, so far as bills and drafts alone are concerned. Suppose purchases of commodity bills by A's bankers to be steadily in excess of their sales of drafts. This excess must be remitted in some way by B's bankers, and if for the moment we continue to assume that commodity bills and drafts are the only media employed, it is clear that it must be remitted by bills against commodities drawn in B, and payable in A. Such bills originate in B, but the moment they pass out of the exchange market — usually on the day of sale — they become credited to A's account in B. They represent a net balance due from B, and as soon as they are credited to A become included in the media payable to A, and are to be set off against the media, originating on that day in A, which are chargeable against A. And A's bankers will not purchase in any short period — a few days or weeks — an excess of commodity bills above their sales of drafts which is substantially greater than the net sums they can expect to receive from B's bankers. For in the absence of media of payment other than bills and drafts they have no alternative way of securing what is due them, and international bankers in general are averse to piling up steady balances due among themselves. The net result will be that the excess purchases of A's bankers in any given short period will be substantially equal to the net balance accruing to their credit in B during that period; a balance which, translated into A's money at the current rate of exchange, will affect their transactions in the exchange market quite as much as tho it had originated in A instead of in B. The tendency of the total money values of media of payment to approach equality hence continues as effective as before, but with this difference: the equality now exists, not between total values of media originating in A alone, but between the total values of media originating in A and chargeable against A, and those of media originating in A and payable to A, *plus* a certain net balance of other media payable to A but *originating* in B (translated into terms of A's currency at the rate of exchange prevailing when they were credited to A's account in B).

The foregoing discussion, for the sake of simplicity, assumed commodity bills and drafts to be the only media of international payment employed. Under the conditions of actual trade, however, all of the types of media previously mentioned are or may be used. But even if we include all of these various types, the tendency to an equality of total money values of media of payment continues to be substantially valid.

A brief consideration of the proximate, short-time results of a disturbance in the exchange market will make this clear. Such disturbances may arise from either or both of two sources: from commodity transactions, or from the "invisible items" field, especially international borrowing. Let us take a disturbance in commodity transactions first, and assume that because of a marked increase in commodity imports, A has a large balance of payments to make to B. Assume also that the disturbance arises suddenly, in the course of a few days — an assumption of course contrary to the usual course of events, but one which will simplify the discussion somewhat. This situation will obviously upset the previously existing equality of total money values of media of payment in A, so far as commodity bills and drafts are concerned. The volume of drafts now demanded from A's bankers to pay for the new imports will greatly exceed the supply of bills offered them for purchase; or else the volume of commodity bills originating in B, and sent to A for collection, will exceed that of drafts originating in B and sent to A for payment; or, more probably, both sets of conditions will prevail. A's bankers will then seek means, other than the remitting of bills and drafts, of making payments in B. They will secure short-time loans from B's bankers; they will ship such securities, both short- and long-time, as have a market in B; and if these expedients are for the time being inadequate (for example, the quantity of international securities which the banks can secure at short notice, without an undue advance in price, is probably not large) they will themselves ship commodities that can find an easy market in B. So especially gold, which under the paper hypothesis enters as a commodity alone.[3]

The net effect of this whole process, as far as A is concerned, will obviously be the restoration, with larger items on each side of the equation, of an approximate equality between the media of payment chargeable against A and the media payable to A. For the original increase in the total money values of the media chargeable against A (that is, the bills and drafts based on the original increase in commodity imports) will soon be offset by the increase in the total money values of the media payable to A. That is, the transfer of securities from A to B, the making of loans, and other attempts to effect a payment of balances due, are to be regarded in the first instance as transactions chargeable against B, and payable to A: transfers of securities, other international borrowings, and so on, are in the short-time view outright sales, and not simply loans. And this short-time equilibrium within either country obviously *must* tend to prevail. Commodity transactions must be paid for almost at once, and international bankers will not as a rule permit large balances to remain long unpaid as between themselves; they will not, and indeed cannot, carry large transactions on their own capital alone for any considerable period. Even if they do so carry transactions the operation, whether undertaken for the benefit of commodity dealers or for other banks, becomes in effect a loan by one country to the other. Under the preceding argument this loan must be placed under the head of media of international payment, and be credited or debited at the rate of exchange prevailing when the loan is contracted.

---

[3] Under the gold standard, gold would begin to flow before any large movement of securities developed. As far as the proximate mechanism goes, this matter of the relative order in time of the various movements appears to be the chief difference between the operation of the elements in the process of adjustment under paper, and their operation under gold.

A similar type of argument applies in substance to the correction of disturbances arising in the "invisible items" fields. New international borrowing on a large scale, for example, will in the *short-time* period, that is to say in the first instance, be offset by increased movements of commodity bills, drafts, short- and long-time borrowings, and so on, in the other direction, with the net result that an approximate equilibrium between "media of payment," in the larger sense of the latter term indicated above, will be restored in each country. If such an equilibrium does not prevail at any given time the exchange rate will move, and by its movement restore substantial equality. Either the movement will cause a change in the volume of the demand for or the supply of media of international payment in each country (especially of finance bills and other short-time borrowings, since the volume of commodity transactions and of long-time investments cannot be materially increased in a few days' time), or it will change the rate at which money values are translated from the one currency into the other.[4] The repercussion of these changes on the level of the exchange rates presents quite a different problem, which will be dealt with at another point; here we are concerned only with the nature of the short-time mechanism itself, not with the ultimate results of its operation.

The substantive results of the discussion up to this point may, for convenient reference, be summarized in two formulae; formulae, it must be remembered, which are here intended to apply only to the "short-time" period, as that period was defined at the beginning of this section, and which are based on the character of the operation of the short-time exchange market mechanism.

FORMULA I

Total money value in money of A of media of payment payable to A = Total money value in money of A of media of payment chargeable against A.

The same formula of course applies to B.

FORMULA II

Either:

Rate of exchange = (Total money value in money of A of media of payment payable to A) ÷ (Total money value in money of B of media of payment chargeable against B),

Or:

Rate of exchange = (Total money value in money of

---

[4] It may also be observed that the tendency toward a restoration of equality between the total money values of media of payment, made effective primarily through a change in the exchange rate quotations, will be still further strengthened in the case of large disturbances by the movement of the discount rate. If there is a large increase in the demands upon bankers for accommodation, whether it be for the sale of drafts or for the purchase of commodity bills, this drain of bankers' capital into international trade will cause a rise in the price charged for the use of such capital (that is, in the discount rate), and thus still further check the disturbance, unless international trade plays a wholly insignificant part in the transactions of the given banking center. For a tentative statistical examination of the correlation between exchange rates and the rate of discount under the gold standard, see the article by E. G. Peake in the Bankers' Magazine, (London) for August, 1921.

A of media of payment chargeable against A) ÷ (Total money value in money of B of media of payment payable to B).

With reference to the first formula, which expresses the equilibrium tendency just examined, this equality between total money values of media has been spoken of above as "approximate." How close is the approximation? Obviously the total values for any given day will not necessarily be equal. But if the previous argument is valid any daily inequality will at once tend to produce its own correctives, in the movement of the exchange (and discount) rates and in the effect of such movements on the demand and supply of media of payment. Since the fluctuations in the exchange rates are themselves the measure of the divergence, the relative inequality can be no greater than the relative amount of the movement of the exchanges between the time they begin to move and the time that the corrective influences become effective. Since this last period is very short (the first shock will probably be taken up in large part by finance bills, which can of course be created very quickly), the inequality will presumably be small at any one time, and will tend always to disappear entirely. It must be remembered, also, that this formula was derived only with reference to the exchange market transactions of a given "short-time" period. When the so-called "underlying conditions" change substantially they will of course end the life of the given period, and they may or may not set up another in its stead.[5] But while the actual content of the terms of the formula will then be materially altered, the effectiveness of the tendency it expresses continues unimpaired. Whatever the time period held in view, the total money values of the media of payment originating in that period which are chargeable against any given country, and payable to it, will tend always to approach equality.

---

[5] See the discussion on this head in Section IV, below.

The validity of either of the alternative statements of the second formula appears almost by inspection. Under the assumptions on which this whole paper is based, there is nothing other than the total money values set upon the media of payment entering the market which *can* determine the exchange rate. In other words, the rate is simply the numerical ratio between the total money values, in the money of either country, that are paid in that country for the right to receive certain sums in the other country — that is, for the title to certain media of international payment — and the total money values, in the money of the other country, that ownership of these media entitles the holder to receive. Both prices and quantities enter into its determination, not prices alone. The two alternative statements may seem to permit the derivation of two distinct rates at the same time. But it is unnecessary to do more than state the fact that modern cable communication, and the high degree of organization of modern exchange markets, make impossible the simultaneous existence of two substantially different rates. Only one will prevail at any given time. This rate will be the resultant of exchange market conditions in each of the two countries. Through the process of adjustment already considered in connection with Formula I, the total money values of the media of payment offered and demanded in each country, if they fail of approximate equality at the then current rate, will alter that rate and in turn be altered by it, until for any given day a rate is established which will hold market conditions in both countries in substantial harmony. This of course does not mean, however, that the rate will be an exact mechanical quotient obtained solely from the media of payment entering the market on that given day alone; speculation and other "extra-mechanical" forces will to some extent modify its theoretically rigid determination, and tend to average up the day-to-day fluctuations in the demand and supply of media. Since these other forces, however, must of necessity find their expression through the agency of total money values, their existence does not constitute an exception to the foregoing analysis.

The preceding paragraphs have been concerned with the nature of the short-time equilibrium tendencies appearing *within* a given country with respect to media of payment. There is also some reason for believing that an equilibrium tendency exists, even under paper, *between* the two countries: that in the short-time period a true par of exchange will appear. But whereas the equilibrium of media of payment will tend, I think, to hold good for any time period whatsoever under paper, precisely as it does under gold, any given parity under paper is wholly dependent for its existence, as will be demonstrated shortly, upon the existence of substantial stability in what have been described as the "underlying conditions" governing international trade, and is indeed created by that stability. As soon as these conditions change materially in either country the given parity is destroyed.

The question of how long this "stability" may properly be supposed to continue is too open to debate to permit the basing of any very positive conclusions upon its existence, and I shall therefore simply present for what it is worth a brief outline of the argument leading to a belief in the existence of a paper parity, without attempting to make this parity an integral part of the general structure of the international exchange process under paper. It must also be remembered that even if such a parity does exist, its actual importance in the conduct of trade depends entirely on how long any one period of "stability" in the general conditions of trade can be supposed to endure. If the period is presumably very short, the parity will have little or no effect on the conduct of trade; if long, it may play a part almost as great as that of the gold parity. The decision is left to the reader.

The economic conditions in each country which ultimately determine the course of international trade may be grouped under two more specific heads: first, the demand and supply schedules in each country for "international" commodities (and indeed, in the ultimate sense, for all commodities); and second, the so-called "invisible items" in foreign trade — charges for shipping, foreign investment, and so on, which are created by the demand and supply of services as well as of commodities. For the purposes of the present inquiry, let us assume that these determining conditions are for the time being constant; either that they do not change enough to affect foreign trade materially, or that the changes in them offset one another.[6] Assume further that the rate of exchange prevailing at the beginning of this period is stable — that is, that it expresses these conditions accurately, and holds them in balance. Given these assumptions, it then appears that certain forces exist in the mechanism governing the exchange of media of payment which will tend to check any movement of the rates away from the level of stability, and to restore them to that level.

Suppose the rate, through some purely temporary cause which is at once removed and which does not affect the underlying conditions, such as an inaccuracy in the competitive mechanism, to move relatively against A. These results will then follow. First, an increased offer in A of commodity bills, a decreased demand for bankers' drafts, and so on through the other media of payment, together with an increase in the total money values of bankers' purchases in A, and a decrease in their sales. Second, an increase in the total money values of media chargeable against A, and a decrease in those payable to A; and an opposite movement in B. Finally, altho the temporary cause of the disturbance is soon removed, and the additional payments due to B are soon made, a rate of exchange will remain which leaves A's bankers with balances to pay to B's bankers: the media-of-payment equilibrium (Formula I) is upset. At this rate, favorable to those having payments to receive in A and unfavorable to those in A who have payments to make to B, the supply of media payable to A is in excess of the demand for media chargeable against A, and A's bankers will therefore quote a new rate, that is to say will offer a new price, more in A's favor. For such a rate will tend to restore substantial equilibrium between the total money values of media of payment, and to make the bankers' accounts with B balance. The reverse process will take place in B. At the same time the movement of the rates against A makes A attractive to B's bankers and exchange speculators for the placing of short-time loans (if they suppose, that is, that the rate will eventually return to something like its original level). This short-time lending will *of itself* tend to shift the rates in A's favor, since it represents, for the moment, an attempt by B to make payments to A.

---

[6] These conditions are probably, in actual trade, in a state of slow but constant change. The amount of the net change in any short period, such as a few days or weeks, will ordinarily, however, be very slight, and with respect to such a period these conditions cannot inaccurately be regarded as substantially constant. The assumption of "stability," when made in connection with a discussion of short-time phenomena, is therefore not unreasonable.

Both sets of forces, international short-time borrowing and the direct effect of changes in bankers' quotations of rates in the exchange market, are thus working to check the movement of the rates, and to bring them back. If the original cause of disturbance be assumed, as above, to be temporary and to disappear almost immediately, it is clear that the return movement of the rates will go on, presumably with various irregular oscillations and counter-movements, until a rate is established which once more satisfies the underlying conditions; that is, until the original rate is restored. For while such a disturbance will presumably affect commodity prices and even commodity movements for the time being, the ultimate determinants of the course of trade, namely the demand and supply schedules for commodities and services, are under the original assumption above not affected. When the disturbance is removed they will reassert themselves, and cause the restoration of the original rate of exchange: granted that monetary stability which was assumed earlier in the paper, no other forces *can* determine it.

In this short-time period, therefore, there is reason for thinking that a self-restoring equilibrium of the exchanges will tend to appear, based primarily on the movements and prices of media of payment, and created simply by the temporary stability of the underlying economic conditions existing in each country. In this sense it then becomes proper to speak of a par of exchange even under paper, tho always with the qualification that its existence depends upon the continuance of this stability; a parity which is derived empirically, and which emerges simply as the level to which the rates tend to return. The nature of the parity in a long-run period, during which these conditions will necessarily change, will be examined in a later section; here we are concerned only with the short-time aspects. It may be added that the paper parity will probably be not a specific rate as it is under gold, but a narrow zone. In the absence of a definite basis for the parity, such as that provided by the ratio between physical weights of standard coins under the gold standard, the operation of the "determinant forces" will probably not be sufficiently rigid and accurate to cause the emergence of a single flat rate. Within this zone, any rate will presumably satisfy trade conditions, and operate as an effective parity. As to the probable width of the zone, it is hard to say. Even under paper a movement in the rates as great as two or three per cent would probably cause a marked counter adjustment in the exchange market, but beyond that I should hesitate to go.

III

We pass now from the short-time mechanisms governing media of international payment to our second principal problem: the commodity market and the relationships between the total money values of a given country's commodity imports and exports. In making this transition we must also change the time period to be held in view. For the treatment of the proximate forces of the exchange market, the "short-time" period defined above was a satisfactory basis. But changes in the commodity situation usually require a time much longer than any one such period to work themselves out. On the other hand, the present section is not concerned with the ultimate effects on the general levels of commodity prices and money incomes of such changes: these questions will be taken up at a still later stage. Rather, it is primarily concerned with the proximate mechanism by which changes in the exchange market are transmitted to commodity prices and movements, and with the immediate effects of such changes on these prices and movements. The time area involved is necessarily indeterminate, and may therefore be designated as a "transition period" between the true "short-time" period of the exchange market and the period required for the appearance of the ultimate effects of a given disturbance on prices and incomes. Something like a year would probably be a reasonable estimate of its usual duration. It is obvious, however, that a time area of this size may embrace two or more "short-time" periods in the exchange market proper, and that the working-out of the effects on the commodity situation produced by the phenomena of any one such short-time period will be blurred and obscured, in its later stages, by the immediate effects on commodities of subsequent changes in the exchange market, arising in a subsequent short-time period. To avoid this difficulty, and to simplify the discussion, these subsequent changes will be ignored here. We shall consider only the mechanism through which, in the course of the transition period, the conditions of the exchange market in a single short-time period alone, even tho this last be of only a few days' duration, are passed on to, and reflected in, the conditions of the commodity market.

It must be observed that this part of our general analysis is not concerned with the why and the how of international commodity trade in general, nor with the forces that ultimately determine international commodity prices. Fundamentally, of course, the commodity market in large part creates and governs the exchange market, but here we still have in mind a period short enough to permit the exchange market to be regarded as having an independent existence prior to the exchange market: so that commodity prices follow, instead of preceding and themselves determining, the prices of media of payment. Taking an international commodity trade for granted, and assuming the underlying determinants of that trade to be in a state of substantial stability, we shall here consider only the changes, within the limits of that stability, which may arise in the media of payment — commodity relationship in a comparatively short-run period. The discussion involves three questions, which will be taken up in order: first, the conditions proximately determining the total money values paid and received for commodity imports and exports; second, the nature of the equilibrium tendencies between such money values; and third, the process by which the volume of commodity movements is affected. After this examination of the character of the particular mechanisms involved has been completed, an attempt will be made to trace the operation of the mechanism as a whole in a specific case of disturbance.

(1) If we define import prices as the prices that the importer pays for the given commodities in the money of his own country, and similarly define export prices as the prices received by the exporter in the money of his country,[7] it is obvious that the commodity market is, in the first instance at least, dependent on and in point of time subsequent to, the exchange market: the prices actually paid or received for commodities in the commodity market are the prices previously paid or received (with allowance for brokers' charges) in the exchange market for the media of payment based on these commodities. But it is also obvious that the given commodity prices may be paid and received not at the same instant that the corresponding prices are paid and received for the corresponding media of payment (that is, not when the total money values of these media are determined, in the money of the one country and of the

---

[7] That is, we are not here concerned with the price that the ultimate consumer gives, or that the ultimate producer receives, unless these persons chance to be themselves importing or exporting directly.

other, by their purchase and sale in the exchange market) but at some later date. The transmission of total money values from the buyers and sellers of media of payment to the buyers and sellers of commodities, and the working-out of the effects of changes in these money values, will ordinarily involve certain "lags" in point of time. The amount of the lags will depend upon the time required to ship commodities from one country to the other, the form of the media of payment employed, and the character of the particular businesses. Disregarding the effect of the "invisible items," which may lessen or increase the amount of the changes in the commodity situation, but which will not alter their qualitative character,[8] these lags are of two sorts.

First, the lag arising in particular transactions. The price established in the exchange market for the media of payment based on a given commodity transaction will, if a bill of exchange be used, determine the *export* price of the commodities involved as soon as the bill is discounted. But those commodities will not enter the *importing* country, obviously, until the time required for their shipment has gone by. Nor will the price originally established in connection with them in the exchange market become a commodity *import* price until after this lapse of time: the commodities are simply not there. If on the other hand bankers' drafts or cable transfers be used, which do not enter the exchange market until after the commodities have been received as imports, the import price is immediately determined with reference to the then current rate of exchange, practically synchronously with the determination of the price of the corresponding medium of payment. But the export price which is received in the other country for these goods may be determined then; or the precise sum that the exporter was to receive in the money of his own country may have been agreed upon previously. In the latter case the import price will be determined by translating this export price into terms of the other currency at the now current rate of exchange, and will be established at a time subsequent to the establishment of the export price by at least the length of time required to ship the commodities. The same thing holds substantially true if the exporter, on the basis of his sales contract with the importer in the other country, is able to borrow from a bank the amount (subject of course to discount by the bank) that he will later receive from the importer.

---

[8] Unless changes be assumed to take place independently in the invisible items themselves during the period of the operation of the proximate commodity mechanism. This possibility, tho more apt than not to present itself in actual trade, may be ruled out here to simplify the exposition.

This lag, however, arises only in relation to a given commodity transaction, and does not necessarily occur in all cases, and while its general effect is probably to cause the import prices of a particular parcel of commodities to lag behind the corresponding export prices, it is perhaps not very important. The second lag, which affects the general body of commodity transactions as a whole, is of greater significance. It arises from the fact that the full effects on commodity prices of any important change in the level of the exchange rates will not necessarily be felt at once, or even at the end of the time lag considered above. Nor can the nature of these effects be predicted in general terms. A given change may operate, for example, to the disadvantage of A's importers, relative to a particular commodity transaction. But only when the next contract is made between A's importers and B's exporters can the full results of the change be seen, for the original commodity transaction was contracted for *before* the given movement in the rates took place, and the gain or loss from the movement, depending on how the contract was drawn, must be accepted without recourse. When a new contract is arranged, however, this movement can be allowed for in the terms of the contract. Needless to say, small or obviously temporary movements in rates will hardly affect commodity transactions; and, also needless to say, the nature of the new arrangement, the distribution of the gain or loss, will depend on the relative advantage or disadvantage in trade of the particular dealers and of the particular countries as a whole. No general prediction is possible. A movement of the rates against A, for example, may cause a rise in A's import prices, with no change in B's export prices, or a fall in B's export prices with no change in A's import prices; and it may cause a rise in A's export prices with no change in B's import prices, or a fall in B's export prices with no change in A's export prices. More probably, the gain and loss will to some extent be divided between the various dealers in the two countries: all four sets of prices will shift somewhat. It must further be observed that in many cases, if not in most, speculation will tend to decrease the time required for these price adjustments, and to diminish the disparity between the various sets of prices. Where the market for the given commodity is highly organized, as for wheat, speculative forces will cause the prices of that commodity in the importing country to adapt themselves to the probable prices of these imports long before they are received or even shipped. With this process, however, we are not here concerned.

(2) So much for the elements in the proximate mechanism connecting commodity prices with the exchange market. It is clear that in the short-run or transitional period here under consideration any given condition in the exchange market will tend to be reflected, with the

indicated lags and barring other disturbances, in the markets for commodities and services, including foreign investments;[9] and it therefore follows that the equilibrium tendency of media of payment in the "short-time" period, summarized in Formula I, will also tend to appear as between the total money values of a given country's exports and imports. That tendency may be expressed as follows:

FORMULA III

Total money value in money of A of A's exports = Total money value in money of A of A's imports.

The same formula, of course, applies also to B's exports and imports.

The term "imports and exports" however, under the conditions of actual trade, of course includes both commodities and services, and the formula therefore applies simply to the *totality* of a given country's international dealings. It governs the total money values, measured in the money of the given country, not only of commodity transactions, but also of international borrowings (regarding these borrowings as being in the first instance an outright payment from one country to the other, and their liquidation as another and separate payment), of shipping charges, and of the various other invisible items.[1] If all prices for such goods and services were paid and received instantaneously with respect to any given transaction, and if changes in the exchange market produced their full effects on commodities and services immediately, this formula would be a necessary and immediate corollary of the media-of-payment formula. Since these conditions of course do not prevail in a dynamic state of trade, the operation of the tendencies it expresses is necessarily blurred and retarded, and it therefore presents a correspondingly less accurate picture of actual conditions. The existence of the various lags previously examined makes it necessary to take as the basis of the formula, not the total money values of the imports and exports entering or leaving a country in any given day or other period, but the total values of those exports and imports which are related to the *exchange market* transactions of that day or period. In other words it obtains its validity and is brought into substantial effect, not from transactions in commodities and services as such — not from the direct relations, for example, between A's exporters and A's importers — but from the operations of the foreign exchange market; that is, from the competition between, and the relations of, international bankers. Under modern conditions it tends to be valid *because* the media of payment formula is approximately valid. It is a resultant only, and there is probably nothing in the mechanism of international transactions in commodities and services alone, as these transactions are now conducted, which would independently make it effective even under the gold standard.

---

[9] Should the conditions of the commodity and other markets thus established not be in substantial harmony with the underlying economic conditions in each country, or should these last conditions themselves change, the result will, of course, be a change in the situation in the commodity markets, and a reflection of this change in the exchange markets and exchange rates. But such changes require a longer time to work themselves out than the "transitional" period here held in view embraces, and they involve a study of certain forces not relevant to the present discussion. Consideration of them is, therefore, reserved for a later part of the paper. See especially the first half of Section IV, below.

[1] No attempt is made in this paper to discuss the mechanism of international borrowing, but it is obvious that such borrowings are of two distinct types: short-time loans, effected between international bankers, and primarily a phenomenon of the

---

money market alone; and long-time loans effected for industrial, governmental or other purposes. The effects of any large movement in the international trade situation will be much more permanent and far-reaching for the second class of loans than for the first, and will operate through somewhat different mechanisms. The reader may also be reminded again of the fact that all the elements going to make up the totality of a given country's exports and imports, whether commodities or invisible items, will at some stage in their life history enter and affect the exchange market. For the purposes of an examination of such imports and exports which takes the exchange market as its point of departure, it is therefore not misleading to regard these elements as homogeneous.

The formula here derived is of course based only on those commodity (and services) transactions which are related to a given set of media-of-payment transactions of a particular "short-time" period in the exchange market. When we attempt to consider the first type of transactions as a whole, and to take an area in time larger than any one such short-time period, the situation with respect to commodities and services becomes very complicated. It is no longer permissible to assume substantial stability in the underlying conditions, and any one chain of effects therefore blurs the operation of preceding and of subsequent chains, and in turn is blurred by them. But the equilibrium tendency with respect to any given set of transactions that find expression in a common exchange market (whatever be the time area of that market) of course continues in operation, and in the long run will be substantially effective for the totality of a given country's trade, irrespective of such time areas in the exchange market alone. Temporary inequalities in particular transactions will largely cancel and disappear in the aggregate of transactions. It is therefore presumably true, as it was for the media-of-payment formula, that whatever the time period selected as the basis, the commodities and services formula is substantially valid for the transactions occurring within that given period.[2]

---

[2] No attempt has been made in the foregoing discussion to show the analogy of the short-run mechanism under inconvertible paper to that under gold, but with certain obvious exceptions this analogy between the mechanisms as such, tho of course not between the results of their operation, is in many respects very close. The three formulae, also, with the qualifications made necessary by the introduction of gold as a part of the legal currency, are presumably as valid under the gold standard as under paper. An application of the method of analysis outlined in this paper to the conditions of international trade under the gold standard, where a conclusive statistical basis can more easily be obtained, might well cast new light on the older theory.

It may be added that a formula for the determination of the exchange rate can be based on exports and imports. Since one country's exports are the other country's imports, under the original assumption of trade between only two countries, the rate can be regarded as the numerical ratio between the total money values in the money of A of A's exports, and the total money values in the money of B of B's imports; or vice versa.

(3) The next question to be considered in connection with the mechanism of the relationships between the foreign exchange markets and commodities is that of the process by which changes are transmitted in the first instance to the volume of commodity movements. (The effect of the invisible items is again disregarded.) The transmission, in addition to the lags of commodity prices behind the prices of media of payment which we have just examined, involves another lag arising from the inevitable delay in the reflection of changes in commodity prices in the volume of commodity movements. The amount of these last changes, even in the first instance, is not necessarily predictable. Suppose, without as yet examining the detail of the process in a particular case, that the net result of a movement of the exchange rates against A is a higher level of the prices both of export and import commodities in A. A's exporters, on finding that they are going to be able to secure a higher price than before for their commodities if import prices in B are left unchanged, may simply elect to pocket the gain without attempting any change in the volume of sales; or they may take advantage of the change to increase their sales by quoting a lower price abroad, and themselves receiving only the original price. And A's importers, on finding that they must pay higher prices than before, may cut down the volume of their purchases and thus, assuming the export supply schedule of the other country to remain unchanged, force a return to the original price paid by them (in which case *export* prices in B will fall); or they may find it possible either to absorb the loss themselves or to pass it on to the domestic distributive system, without reducing the volume of

But such a derivation of course yields only the rate which tends to appear as a "normal" or average level with respect to the given set of transactions, rather than the rate actually quoted on any given day: that rate is, as already indicated, proximately determined with reference to the total money values of media of payment entering the exchange market.

the flow of goods. If on the other hand the result of the movement of the exchanges against A were, not a rise in A's commodity price levels, but a fall in B's price levels with no change at all in A, the opposite chain of argument would apply to B's exporters and importers. The volume of B's commodity exports might stay the same, or fall off; of imports, stay the same or increase. Finally, if the movement of the rates affected commodity prices in *both* countries, as would more probably happen in actual trade, the result would be an unpredictable and indeterminate blending of these two types of change in commodity movements. And the closeness with which the change in commodity movements would follow that in the exchange rates is also unpredictable. In addition to the "lags" of commodity prices behind the prices of media of payment, there is also a possible lag due to the varying rapidity with which exporters and importers can or will change the volume of their purchases and sales.

Only by assuming a movement in the exchange rates so great and of such duration that if a loss were involved exporters and importers and the distributive systems could not absorb it, or that if a gain were involved competition would break up any general attempt to monopolize it, can we safely assert that a change in the volume of commodity movements will necessarily follow a movement in the exchange rates. And even with this assumption neither the amount of the change nor the closeness with which it will follow the movement in rates can be definitely predicted; only its direction can be foreseen. Finally, the various alternative results that can follow any given movement in the exchanges are so numerous that a positive statement as to the nature of the probable effects on commodity price levels, and on commodity movements in general, can have but little significance. Before any one such movement can work itself out another will begin, and the results of the first will become inextricably blended with those of the second. The effects of such a movement on the "invisible items" will be equally complex and unpredictable, but under the original assumptions leading to a virtual elimination of this field they may be ignored here; granted monetary stability, the dominant and determinant factor in international trade will of necessity be commodity transactions and commodity movements.

We have now completed our examination of the various elements of the mechanism which proximately connects the exchange market with commodity prices and commodity movements in the "transitional" period. To present a more coherent picture of that mechanism as a whole it will perhaps be profitable to trace through the effects of its operation in a specific illustrative case of disturbance — disregarding, for the purpose of the argument, the effects of those subsequent disturbances which would almost certainly arise in actual trade before the original chain had worked itself out. Let us take two countries, A and B, and assume that some change in the general industrial conditions of B results in a considerable increase in B's demand (in the schedule sense) for imports of steel from A. Assume also, to simplify the discussion, that the net result is a permanent increase in the volume of these steel movements.[3] What will happen?

B's demand for A's steel has undergone a marked increase in the schedule sense, but the new price level for imported steel, whether higher or lower or the same as before, and the extent of the increase in the volume of commodity movements, cannot be determined except with reference to the new level of costs of production for steel in A, and to the exchange rate. The cost of producing steel in A will presumably rise at first, from the operation of temporary increasing costs, altho ultimately, when the steel industry has become adjusted to the increase in output, the operation of decreasing costs will probably cause the price of steel to fall below the original level. The transmission of these various effects to the importers of steel in B, however, will in turn depend upon the level of the exchange rates, and to their determination we must first turn. It is obvious that if we can assume the general character and volume of the trade between the two countries to remain for the time being unaltered, except with regard to steel, the exchange rate will move in A's favor. (The detail of the change will be considered in a moment.) This movement will, by tending to lower A's export prices, discourage A's steel exporters, while by tending to raise B's import prices it will discourage B's steel importers.[4] The net result will be a somewhat smaller increase in the volume of steel movements than would have taken place had the old exchange rate been maintained; and, unless A's steel exporters will accept the whole loss in order to expand their market to the utmost, a rise in the prices of steel imports in B.[5]

---

[3] In other words we are materially altering the "underlying conditions" governing trade, and attempting to trace the process by which exchange and commodity markets adjust themselves to the new status of these conditions. To simplify the discussion still further we may also assume that the change takes place rapidly, and that the underlying conditions then resume substantial stability for some time, tho of course on a new level; that is, no further fundamental disturbances are introduced.

---

[4] Theoretically, A's export prices might continue unchanged, and B's import prices be lowered by the amount of the shift in the rates; or B's import prices continue unchanged and A's export prices rise. In actual trade both sets of prices will almost certainly be affected somewhat.

[5] In the long run, when the operation of decreasing costs will presumably cause a decline in the prices of steel exports in A, the prices of steel imports in B will fall and the volume of the steel movements will increase somewhat, unless the steel exporters in A elect to keep all the gain and do not attempt to increase sales. If the total money values of the steel exports continue unchanged the exchange rates will not be affected. If they are altered the rates will shift also, and slightly modify these results. The primary determinants here are of course the supply schedule for steel in A, and the demand schedule in B, together with such changes as may occur in those schedules.

With respect to the general question of changes in the level of export prices, it may be

So much for the effects relative to steel alone. There remains for consideration the question of the effects on the exchange rate and on commodity movements in general. The mechanism of the operation of these effects has been indicated at some length in the preceding pages, and need not be presented in detail here. The increase in exports of steel from A will cause an increase in the demands upon international bankers for means of payment in A (an increased supply in A of bills of exchange, or an increased demand in B for bankers' drafts, etc.), and consequently a movement of the exchange rate in A's favor. This movement, as explained elsewhere, may by simply changing the ratio at which money values in the one currency are translated into terms of the other be of itself sufficient to restore equilibrium in the exchange market. More probably, by making A a favorable place to sell goods, and B a favorable place to buy, it will call forth an opposite supply of or demand for media of payment, largely based on goods, and adequate to offset those media newly created by the steel transactions.[6] In both cases A's imports would be encouraged and her exports discouraged, through the mechanism and with the "lags" previously discussed; and, as was also indicated above, the change in commodity prices and movements will in turn result in a shift of the exchanges somewhat in B's favor. Whether or not the shift will be all the way back to the former level will depend on the relative advantage in

---

added that in manufacturing the most probably result of an increased output, if the increase be an appreciable percentage of the former output, is of course increasing cost at first, followed by decreasing cost as the industries adapt themselves to the new demand. For agricultural products the second stage is less likely to follow, unless the increase in demand be so great as to induce radical improvements, and in any event will probably appear much more slowly. The ultimate results of disturbances in this field would, therefore, be somewhat unlike those of the industrial disturbance here considered.

[6] A small movement might be offset by the transfer of international bankers' capital from one country to the other, without affecting commodities at all, but a movement of any importance and permanence will almost inevitably affect commodities.

trade of the two countries in the light of the new steel movements.[7]

The initial results of the steel transactions on the general trade situation then are, first, a movement of the exchanges in A's favor; second, an increase in the volume of A's commodity imports and a probable decrease in the volume of A's exports other than steel; and third, a return movement of the exchanges in B's favor. Beyond this point it is hardly profitable to push the analysis of the mechanism. The changes in the volume of A's exports and imports, because of their reaction on the demand and supply schedules of both countries, will in due course and after various lags again affect the exchanges somewhat, and this movement will start another cycle. The process becomes similar to a decreasing spiral, and need not be pursued farther. The two things of significance, which bring some order out of this chaos, are first, the tendency of the total money values of the media of payment chargeable against and payable to any given country to approach equality (Formula I); and second, the tendency of commodity prices and commodity movements to follow, with the indicated lags, important changes in the prices of the corresponding media of payment.

The net effect on the exchange rate, so far as the steel transactions alone are concerned, will probably be some permanent shift in A's favor. Inasmuch as B is taking an increased quantity of goods from A,[8] without any time to the commodity market: it has regarded commodity prices as resultants rather than as determinants of the prices of media of payment. This method of approach is valid for a treatment of the short-run period, but in the ultimate view of the case commodity prices and commodity markets are of course the real determinants. The present section takes this "ultimate" view as its basis. It will attempt to deal with certain long-run aspects of the foreign trade situation, and especially with the question, hitherto necessarily neglected, of the relationships prevailing between international conditions and the more purely domestic conditions within any given country. Of the various specific problems which at once suggest themselves we shall consider only four: first, a continuation into the long-run field of the earlier examination of the working-out of the effects arising from a given case of disturbance in the field of international trade proper; second, an examination of certain aspects of the long-run relationships between the various kinds of prices — export, import, and domestic; third, a brief consideration of the connection between international trade and the phenomena of the business cycle; and finally a tentative investigation of the probable character of the par of exchange under inconvertible paper, in the long-run period.

---

[7] The ultimate result of the steel transactions might be the simple substitution of steel for some other commodity or commodities in A's export trade; or A might be induced to accept new imports from B that would offset the steel exports in the exchange market. Obviously the results on the advantage in trade, on the levels of export, import, and domestic prices, and even on the exchange rates, cannot be predicted except in terms of the trade of particular countries at particular times; and even this prediction would be dubious. See the discussion, however, in the next section.

[8] Any large increase in particular commodity imports will in actual trade almost certainly produce some permanent increase in the totality of imports; and in the first instance will cause a very marked increase. See footnote 6 above.

It will be remembered that the specific disturbance discussed at the end of the previous section arose from a marked increase in the demand of B for the steel exports of A. The ultimate results upon general price levels and money incomes of the working-out of the effects of any single process of this sort would, under the conditions of actual trade, be almost certainly blurred and hidden (as was explained above) by the effects of subsequent disturbances in the exchanges, and of disturbances arising from sources other than the field of international trade alone. If however we can be permitted, for the purposes of the argument, to abstract from these other disturbances, we can then indicate to some extent the probable nature of the effects on prices in general, and on money incomes.

To return to the earlier hypothesis, A is now exporting much more steel to B than before. This increase may simply represent a diversion of A's production of steel from domestic markets to the export trade, and a shift of labor and capital from domestic to export manufacture, but more probably the larger part of it at least, assuming a substantial increase in exports, will be new production. Furthermore, this new steel may be a net addition to the volume of A's exports; or it may represent in some part simply a substitution of steel for exports of other commodities. The first alternative will presumably be the immediate result; the second, the ultimate one, since the general tendency of the exchanges to move somewhat in A's favor will restrict those exports of other commodities which had only just been profitable at the former rates. Eventually, then, the volume of A's exports will be increased by an amount somewhat less than the increase in the volume of steel exports alone.

What of the volume of A's imports? B must make to A an increase in payments great enough to offset in the money of A the increase in A's exports, and under the rigid paper hypothesis these payments will in large part be made in commodities. A part of the payments, also, may be made by a shift in the balance of the "invisible items," but for reasons explained earlier in the paper this form of payment will be neglected here.[9] The net

[9] If independent disturbances in this field be ruled out, as they were by the original hypothesis of isolation in connection with the present chain of effects, the invisible items will not introduce any qualitative modifications into the conclusions reached. Their effect will simply be, by their absorption of a part of the disturbance in the general situa-

immediate result of this disturbance, as was shown in the last paragraphs of the previous section, was a movement of the exchange rate against B. Therefore an increase in the volume of B's exports, more than proportional to the increase in the volume of A's exports, will now be necessary to effect the required additional payments: B's products are worth relatively less than before in A's money, and A's products relatively more in B's money. It is true that insofar as the steel exports tend merely to replace certain other items in the totality of A's exports, an increase in payments by B will become unnecessary; and insofar as the exchange rate, even with an increase in payments by B, tends to swing back to the original level—a possibility suggested in the earlier discussion of mechanisms—a more than proportionate increase in the *volume* of B's exports will also be unnecessary. But if the new commodity transactions are of any considerable size, only an abnormal peculiarity in the conditions of demand and supply will prevent some permanent shift of the exchange rate in A's favor, as far as this series of causes alone is concerned.

The net long-run results of these changes can be stated briefly. There has been an increase in the volume of A's exports, but a more than proportionate increase in the volume of B's exports; hence there will be more commodities than before in A, and less than before in B. Under the quantity theory, and with the original assumption of a fixed quantity of money within each country, this will mean some eventual fall in the average of A's prices, and some rise in the average of B's.[1] On

---

tion, to diminish the quantitative importance of the effects passed on to commodity prices and movements. The invisible items of especial importance in this connection are transfers of international bankers' capital, and transfers of investment capital. The former, primarily in the guise of finance bills, are the principal agency through which large disturbances will in the first instance be checked and absorbed.

[1] These results would seem to be in diametric opposition to those obtaining under gold, for in the strict Ricardian reasoning a new need on the part of B to make payments

the whole A gains, and B loses, from the results of the train of effects produced by the increase in the steel transactions. A's people gain insofar as their money incomes fail to reflect, or lag behind, the fall in commodity prices (which is presumably not great, however, since the change in the total volume of commodities in A is small, relative to that volume); and they gain directly, insofar as they are consumers of imports, from the lowering of the level of import prices.[2] Moreover A, as a country, is receiving more commodities than before from B, while she is paying for those commodities with a less than proportional increase in her own exports: she is getting her imports at a *lower* commodity price. *Mutatis mutandis*, B's people lose. For them the level of import prices has risen, money incomes will lag behind or fail to reflect the rise in prices, and B, as a country, is paying a *higher* commodity price than before for her imports. Further, money incomes in A's export in-

in A would lead to a flow of gold, a rise of prices in A, and a fall in B. But I cannot see that the results in the two cases are necessarily inconsistent. Under the gold standard, if B has new payments to make to A, part of those payments will of course be made in gold, if the exchange rates move far enough; and to this extent the Ricardian reasoning as to the effects on prices is valid. But a large part of the payment — and, if the latter is of considerable size, perhaps the largest part — will be made in commodities, precisely as under paper; and as far as these commodities alone are concerned prices will be affected, under the quantity theory, in a way exactly opposite to that produced by the gold movements alone: prices in A will tend to fall, and in B to rise, precisely as under paper.

The net result may be a rise of prices in A and a fall in B; or a fall in A and a rise in B; or no change at all. The amount and direction of the change, for example in A, will depend on the relation between the proportion that the new gold bears to the media of payment already circulating, and the proportion that the new increment of commodities bears to the commodities already in process of exchange. If the former is larger, prices will rise; if the latter is larger, prices will fall; and if the two are substantially the same no change will take place at all. And the same type of argument applies to B. In other words the theory of the price changes appearing under inconvertible paper is *not* inconsistent with that of the changes under gold; the former is simply a special case of the general theory that works itself out more fully under gold.

In this connection see the paper by Professor Taussig, already referred to, in the Quarterly Journal of Economics for May, 1917.

[2] Logically, of course, A's import prices might remain unchanged if B's export prices fell by the full amount of the shift in exchange rates, and vice versa, but a compromise result is more probable: one set of prices will fall a little, and the other not so far as it otherwise might. It must be remembered, of course, that the exchange rate is not determined even ultimately by import and export commodity *prices* alone, but by total money values.

dustries will not fall, and may rise (from the probable rise in export prices and from the ultimate operation of decreasing costs), while for the opposite reasons money incomes in B's export industries will not rise, and may fall.

The foregoing discussion has traced the chain of consequences following on a change originating primarily in the international trade situation. The requirements of logical completeness also demand an examination of the chain of consequences produced by a change originating in the "domestic" situation as distinct from the purely "international." Such a change would be represented, for example, by a rise in the general price level in A due to monetary causes alone, and not accompanied by an original change in either A's or B's supply or demand schedule for foreign trade commodities. The mechanism of the consequent effects, however, does not differ in its component elements from that which we have already outlined, and any very detailed or accurately qualified discussion would simply involve a repetition of the argument above. The probable results of its operation can be indicated very briefly.

Granted a rise of relative importance and permanence in the general level of A's prices, the accompanying rise in A's export and import prices [3] will reduce the volume of commodity exports, increase that of imports, and through the effects on the total money values of media of payment produce (with the necessary allowance for "lags," which now operate *from* commodities *to* media of payment) a marked initial movement of the exchange rates against A. This movement in turn, through the mechanism already examined, will result in still higher import prices in A (higher by the initial rise, plus the rise due to the adverse movement of the exchanges), and in higher export prices; while in B export and import prices will stay the same or fall. These conditions will, however, through their effects on the demand and supply schedules in the two countries, tend to increase the volume of A's commodity exports and decrease that of its imports, relative to the initial changes in those volumes. The exchange rate, in comparison to its earlier movement, will now swing back somewhat in A's favor, and this swing will set up a new chain of effects, of somewhat smaller quantitative importance than the preceding one. As far as this cause of disturbance alone goes, then, there will follow a diminishing spiral of such alternate movements and repercussions, which we need not trace in detail, with the net result that, taking the exchange rate fluctuations as a whole, the level of the rates will have moved permanently against A. And, again without repeating the argument of the preceding pages, it further appears that as a result of this change A will lose, while B will gain: a result opposite to that produced by the disturbance previously considered. Prices in general in A, and especially import prices, have risen,[4] while money incomes will lag behind or entirely fail to reflect the change in commodity prices. Moreover, export industries will be in some measure discouraged. In B the opposite conditions will prevail.

---

[3] The question of the relationships between domestic and international commodity prices is discussed below. Here, without examining the mechanism of the process, it is arbitrarily assumed that the rise in purely domestic prices has eventually caused a similar movement in the international prices of the given country.

The question of the general relationships prevailing under inconvertible paper between export, import, and domestic prices is not capable of any very definite answer. The earlier discussion has shown, incidental to the examination of other matters, not only that export and import prices within any given country can and will move for considerable periods in different directions, but also that such movements may arise quite independently of the situation in the markets for purely domestic commodities. And no force originating in the field of purely international trade was discovered which would of itself restore any given previous relationship between the three groups of prices. In a dynamic state of trade this constant change is inevitable. The underlying conditions that determine domestic as well as international trade, and that govern the direction of the investment of a given country's capital and labor, are themselves continually changing, and the various sorts of prices in which they find expression must necessarily alter their relationships in correspondingly unpredictable fashion. Nor is this situation peculiar to the conditions of trade under inconvertible paper. It is equally true of countries whereof the monetary systems are based upon gold. Only this can be said: if the terms of the trade between two countries are such as to make the production and exchange of international commodities either a distinctly more profitable or a distinctly less profitable field than purely domestic investment, the result will under competition tend always to be a shifting of labor and capital into the more favored field. Money incomes received for similar sorts of services (whether it be the services rendered by the recipient himself, or by something he owns) will tend always to approach equality, tho haltingly and only after an unpredictable lapse of time. But the proximate agency in this process is of course the price mechanism, and in this sense the three groups of prices may be said to move, or to tend to move, in harmony.

---

[4] The increase in the volume of commodity imports relative to exports would, taken alone, cause prices to fall, but the quantitative importance of this influence in the general price situation will be offset by the more than proportionate increase in commodity import prices — proportionate, that is, to the increase in the quantity of commodities themselves.

There seems to be some reason, also, for thinking that import prices are somewhat more sensitive than export prices: that they will react more quickly to changes in general conditions, whether these changes be domestic or international. First, they are one step nearer the consumer in the distributive mechanism. Second, they must be proximately determined with direct reference (from the importer's point of view) to market conditions within the importing country, whereas export prices are determined in the first instance abroad, and the exporter may be able to pass on any given disturbance, for a time at least, to foreign import markets. Third, the effects of speculation in discounting future price changes, and in bringing the prices of international and domestic commodities into harmony, are probably felt primarily in the field of import rather than of export prices, since the prices of goods that will *enter* the given country are of greater immediate importance in the general domestic price situation than the prices that will be received for goods *leaving* that country (for export prices are of immediate concern only to the given producers involved; import prices, to all domestic sellers and buyers of the commodity). Finally, since the general terms and conditions of production can be changed only with relative slowness, import prices probably tend to be established, in the first instance at least, with reference to the corresponding export prices in the *other* country. A decrease in the (schedule) demand of either country for imports, for example, would presumably at first merely cut down the volume of export production in the other country, without necessarily affecting prices either there or in the importing country. Only after some time would it result in a substantial reduction of prices and in the driving of labor and capital out of the export industries involved.[5] This whole argument may be open to question, and is advanced simply for what it is worth. It may be added, however, that insofar as it has validity the exchange rate would appear to move, in any given case of disturbance, with export prices as the proximate base or pivot: that is, it will tend to produce its principal *initial* effects on *import* prices.

---

[5] The possible "lag" here considered is, of course, not to be confused with the lag examined earlier in the paper in connection with the export and import prices of a particular shipment of goods; a lag which arises only in the proximate, short-time mechanism of exchange, and which operates in the opposite direction.

Finally, apart from questions of detailed mechanism, it is obvious that the character of the general relationship between international and domestic prices will depend in part on the relative importance of international trade in the economic life of the given country. Where that importance is slight, the international prices of the country concerned will be primarily resultants, and changes in them will tend to follow, rather than to cause, changes in the domestic situation. Where it is great, as in England at the present day, international phenomena may themselves be a significant and even a dominant factor in conditions which are primarily domestic. Changes in the volume of international trade may affect purely domestic prices materially, through changes in the proportion of commodities in the given country to the quantity of money; and, of perhaps greater actual importance, changes in the volume of the media of international payment may change the level of the discount rates, and thus produce a marked effect upon the conduct of purely domestic commerce and industry, with a corresponding effect on domestic prices.

Closely related to this question of prices, and probably an integral part of the general connection between international and domestic trade, is the question of the phenomena of the business cycle. No attempt has been made to introduce the business cycle into the earlier discussion, and too little is as yet known about its nature and its operation to permit the drawing of general conclusions based upon its existence, but we may at least suggest one or two modifications which a full recognition of it would necessitate in the previous analysis. First, the operation of the short-time mechanism examined in the second section of this paper might well be appreciably altered, at least with regard to the nature of its quantitative results, by the position of the given country in the business cycle. If, for example, the country were in a period of general depression and contraction, a lowering of commodity import prices following a favorable movement of the exchanges would not necessarily result in increased purchases by importers, and certainly not in so great an increase as would appear in a period of rising prices; and a period of acute depression might virtually suspend the operation of the international trade mechanism. If viewed in this light, the previous analysis of that mechanism must be regarded as based primarily on "average" or "normal" conditions.

Second, the passage of the country through the business cycle will *of itself* change the levels of commodity prices in general, alter exchange market conditions through the effect on the discount rate, affect the desire and the ability of dealers and producers to engage in commerce, and thus change the terms at which the given country can trade — quite apart from any necessary change in the general character and direction of its industry and commerce. Should the cycles in the countries involved proceed at different times and rates, wide fluctuations in the exchanges might follow from these differentials alone. Finally, the cycle will obviously affect the terms and amounts of international borrowing. On the other hand, its effects will be felt primarily in the field of raw materials and unfinished goods, especially those entering the more important industries, and only in much smaller degree in the field of what may be called consumers' goods. But it is at most possible here to indicate some of the questions which the relation of the business cycle to international trade suggests.

The last problem to be considered is that of the long-run nature of the so-called par of exchange under inconvertible paper, a problem which has been reserved until this point because it seems to be most open to debate, and also because it is not a necessary and integral part of our general argument. In the "short-time" period the paper par of exchange, or "zone of parity," was found to be created by and dependent on the existence, admittedly temporary at best, of substantial stability in those underlying conditions which ultimately govern the terms and the course of international trade. But in the long run these determinant conditions will of course change materially and unpredictably, and in changing must destroy the particular parity based on their previous stability. Either one of two views concerning the character of this change is tenable. It can be regarded as absolutely continuous, in which case there will be no possibility of the appearance of a true parity, however brief the time period of which it is predicated; or it can be regarded as proceeding in a series of stages, as alternating periods of marked general variation with periods of comparative quiescence, during which specific changes in one direction are substantially offset by specific changes in the other.

The latter view seems to me to be more in accord with what is known of the general character of business activity, and with general economic reasoning. In the long run the exchange rate may be regarded as being simply an expression, through the medium of the various kinds of prices, of the relationships and interactions between the underlying economic conditions of the one country and the other.[6] If these conditions change the rate will change, in the absence of a corrective device like the gold parity; if they remain comparatively stable or "static" for a time it also will tend, barring monetary disturbances, to remain stable, and to give expression to that temporary stability in the form of a true par of exchange — a parity, it may again be observed, which is derived empirically, and which emerges simply as that point or zone to which the rates, during the continuation of underlying stability, tend to return. In other words, altho over a period of years no one such parity can be maintained under paper, nevertheless a discrete series of short-run parities will tend to appear, none of them being necessarily the same as any other. But the point need not be pressed further.

---

[6] The exchange rate actually prevailing in the market is fundamentally, of course, a product of two main sets of forces, not simply of one; first, of the interactions as between

This paper has been chiefly concerned with the mechanisms and processes which may be presumed to appear in international trade under a paper régime. To simplify the analysis as far as possible certain assumptions were made, and adhered to throughout the discussion. Two countries only were considered; fairly effective competition in and between these countries was postulated; and the problem of monetary disturbances was ruled out by assuming the quantities of money within each country to be fixed. In addition the factor of "invisible items" was as far as possible eliminated. The qualifications to the conclusions here reached which these assumptions make necessary would now be appropriate, but this task

---

countries of the underlying economic conditions in each; and second, of the monetary situation within each country. This second set of forces has been ruled out of our whole discussion, or made at most a negative translating agency, by the original assumption of a fixed quantity of money in each country. Any attempt to define the ultimate character and function of the exchange rate in more specific terms (such as those suggested by a long-run application of Cassel's purchasing-power-parity doctrine) must of necessity be open to serious question. The relation of the rate to the complex and constantly shifting forces which fundamentally determine it is hardly capable of being definitely formulated. All that can be said is that, in the ultimate sense, the rate tends to express the results of the interaction of these forces in and between the countries involved, and to hold them, through pecuniary mechanisms, in some sort of aggregated balance — a balance, as has already been indicated, in which the terms are rarely at rest.

may be left to the reader: the primary concern here has been the composition and operation of the various mechanisms, rather than the quantitative nature of their results. Nor has any systematic effort been made to point out the differences and the analogies between the mechanisms existing under paper and those existing under the gold standard, illuminating tho these be: limitations of space, as well as the danger of obscuring the course of the argument, forbade. Finally, the lack of adequate data has prevented any attempt at a correlation, however superficial, of the tentative results here obtained with the conditions of international trade in Europe during and immediately after the war, when many countries were in effect if not avowedly on a paper basis. Nevertheless the material for the proof or disproof of these results will to a large extent be found in the economic incidents of the war period, and it is perhaps permissible to hope that the conclusions here reached will prove to contain an explanation of at least a part of the extraordinary disturbances in foreign trade witnessed since 1914. Those disturbances clearly indicate the desirability of an inductive investigation along lines that may well be new, and that may demonstrate, as a corollary, the need of an amplification of certain parts of the older theory.

James Waterhouse Angell.

Harvard University.

A THEORY OF PROFIT AND INTEREST

SUMMARY

New sources of reliable data, 414. — I. The facts: primary and secondary data, 415. — Examples in industry, the laws of the optimum and of the two returns, 416. — Similarly in agriculture, 421. — The costs of production decrease with the increase in capital, examples in industry, 425. — Similarly in agriculture, 429. — Vertical integration reduces cost, 430. — Two opposing factors bring about the emergence of the three laws, 431. — II. The theory: New formulation of the two laws of return, 437. — The law of equilibrium, 442. — The emergence of the optimum size, 446. — Differences in capitals the cause of the emergence of profit, 447. — The older theories invalid, 447. — The Marxian theory is based on wrong secondary data, which assume but do not prove the conclusions, 448. — Theory of interest, 449. — Influence of both kinds of size, 451. — Influence of time, 452. — Singular position of commercial loans, 452.

INTRODUCTION

THE laws to be established here are as follows: In every business there is a size of capital, called optimum size, which yields a maximum rate of profit. The rate of profit on other capitals exhibit a law of increasing returns below, and one of decreasing rates beyond, the optimum size. The cost of production decreases with the increase of capital even beyond the optimum size. The rate of interest on loans has a minimum in every industry, namely, in the loan to the optimum size of the industry. The interest paid by the borrower to the lender cost the borrower nothing, neither labor nor time; because it is created by the law of increasing return, without additional labor, without additional time.

In what follows, the term capital is used as equivalent to "total investment," and in the case of corporations it includes the following items:[1] "Capital stock, bonds, and other long-term debts; surplus as reported by the company; all items of appropriated surplus, such as reserves for income and excess profits taxes, discounts, bad debts, etc.; and the average of current borrowings as shown for the first day of each month. Reserves which were not appropriations of surplus, such as depreciation on buildings, machinery, etc., were not included. From the sum of the foregoing items were deducted such assets as are attributed to good will, patent rights, trade marks, etc., together with the sum of all investments in property not used in the manufacture."

---

[1] Federal Trade Commission Report on Shoe and Leather Costs and Prices, June 10, 1921, p. 97.

The most closely guarded secrets of every business are its capitalization, its profits, and its cost of production. Our knowledge of the first was notoriously defective. This prevented the U. S. Census from ascertaining statistics on profits. It says on this point:[2] "Even if the amount of profit could be determined by deducting the expenses from the values of the products, the *rate* of profit on the investment could not properly be calculated because of the very defective character of the returns regarding capital." As to costs of production, practically no data were available, and the economists believed that in every industry they were practically the same for all factories except for differences due to different managerial efficiencies. But in 1914 the Federal Trade Commission was established and given inquisitorial powers. Its statements regarding industries are authoritative. Similarly, the U. S. Department of Agriculture has published in the last few years many bulletins on farming as a business.[3] These two series of publications furnish a fund of information to test economic doctrines.

---

[2] Abstract of the 13th Census of the United States for 1910, p. 437.

[3] The Reports of the Federal Trade Commission will be referred to here, as "Reports" and the Bulletins of the Department of Agriculture as "Bulletins." The predecessor of the Federal Trade Commission, the Bureau of Corporations, has published, in 1911 to 1913, a report on steel, in three parts; which will be also freely drawn upon and referred to here, as Steel Report.

I. The Facts

1. What do we understand by the term "facts"; particularly, what are scientific facts?

If a physicist investigates the fall of a stone in space, he will use the best instruments, and among others the best clock that he can secure; and measure the fall of the stone, say for every one-tenth of a second. His measurements are facts; we shall call them the primary data.[4] If the physicist, or any other physicist, repeats the experiment the next day he will not get the same results, not the same primary data. There are three main causes for this disappointing state of affairs.[5] The physicist is not absolutely exact himself; his instruments are not accurate; and the surrounding conditions, like the weather, even the building in which the experiments are conducted are sources of error and disagreements. However often the experiment is repeated, no two results ever agree; therefore, primary data cannot possibly be used as building stones for the science. The necessity arises of devising a method by which other data, called secondary data, are derived from them; which may be used as the basis of a science. A common device is to take the measurements referring to a certain quantity and take an average of them. The figure so obtained is a secondary datum. Secondary data are those which are gotten by adjusting in any manner the primary data. They are removed one or more steps from the form in which they were observed. Every law of every science holds always good only for the secondary data, but is not necessarily true for the primary data.

---

[4] H. Secrist, Statistical Methods, p. 16.

[5] L. Kotany, "The Accuracy of Labor," Quarterly Journal of Economics, August, 1920.

In trying to proceed in the investigation along the lines of the exact sciences we must try to get, for every quantity we desire to establish, as many primary data as possible; because the greater the number of primary data is, the greater the accuracy of secondary datum derived from them — and here we encounter a difficulty. Suppose we desire to ascertain the rate of profit in the shoe business, of factories with the capital of $200,000. Referring to the definition of capital given above, it is obvious that we cannot expect to find even a single factory whose capital is exactly $200,000. In order to overcome the difficulty we shall take all factories, the capitals of which are within certain limits, for instance, factories, the capitals of which are within $100,000 and $250,000, and average the rates of profits made by these factories. This is, indeed, the manner in which the statements in the Reports, and in the Bulletins are gotten up.

We now proceed to give the facts as ascertained in the Reports and Bulletins.

2. The Federal Trade Commission investigated the rates of profit of 237 shoe manufacturing companies, and reported as follows:[6]

Groups	Per cent earned					
	1914	1915	1916	1917	1918	1919
Under $100,000	12.8	14.6	31.5	26.5	20.6	39.9
$100,000 to 250,000	16.7	15.8	25.2	22.5	21.8	40.7
$250,000 to $1,000,000	15.5	15.2	26.6	25.0	18.2	40.8
$1,000,000 to $3,000,000	15.0	15.5	26.3	20.3	23.0	41.6
Over $3,000,000	14.7	14.6	25.4	26.3	21.3	39.9

---

[6] Report on Leather and Shoe Industries, August 21, 1919, p. 104. The last two years are from Report, June 10, 1921, p. 105.

In the year 1914 the capital between $100,000 and $250,000 made the maximum rate of return, and therefore this size is the optimum size. The capitals less than that exhibit a law of increasing returns, while the capitals greater than that show a law of decreasing returns. In the year 1915 the same three phenomena are shown, with one small difference pertaining to the capitals between $1,000,000 and $3,000,000. The small difference would have disappeared if the capitals had been grouped differently. For our purpose it is not necessary to have the same groups every year, they are only made if the results of one year are to be compared with the results of another year; but for the purpose of establishing economic laws each year may be considered by itself, and the fact that by a grouping of the capitals the three phenomena emerge is the important feature, and not the sizes of the groups themselves. It is also clear that the European purchases introduced the element of imperfect competition, which accounts for the deviations from these three phenomena. In the year 1916 the second item disturbs the emergence of the three phenomena, but a regrouping would show them in utmost purity. When we entered the war in 1917 the disturbance was still greater, and similarly in 1918. After the war ended in 1918, the three phenomena appear again in utmost purity in the year 1919. In that year the optimum size appears, however, for the capital of $1,000,000 to $3,000,000.

It is really only necessary to show that the maximum exists. The two other phenomena, that of increasing and decreasing rates of return, follow from it necessarily as mathematics proves.

The results in the case of fifty tanning companies are as follows:[7]

---

[7] Report on Leather and Shoe Industries, August 21, 1919, p. 28.

Groups	Per cent earned			
	1914	1915	1916	1917
I. Under $100,000	9.7	15.7	24.0	32.6
II. $100,000 to $250,000	13.6	23.5	26.6	34.4
III. $250,000 to $1,000,000	12.4	16.0	30.4	29.3
IV. Over $1,000,000	12.8	16.4	34.6	25.4

Every year of the four years shows clearly the law of the maximum rate of return. The laws of diminishing and increasing returns show strictly in 1917. In 1914 and 1915, the results deviate from them in one item each by less than one-half a per cent, which is really remarkable, considering the disturbed times. In the year 1916, the divergence is greater in one item, but a regrouping would smooth this out. The fact that such a grouping according to size is possible is the essential point, the details of the grouping are of no importance.

In the commercial wheat flour milling business, the result is as follows:[8]

Groups	Per cent
I. Over 1,000,000 barrels	22.2
II. 300,000 to 700,000 barrels	23.3
III. Under 300,000 barrels	19.8

All three laws show clearly and strictly.

In the meat packing industry there are over a hundred packers with comparatively small capitals. The maximum rate of return is secured by those having a turnover of between $10,000,000 to $25,000,000. Those having larger turnovers realize a smaller return, and the five huge packers of the country have a still smaller rate of return. This appears from the following two tables:[9]

---

[8] Report on Commercial Wheat Flour Milling, September 15, 1920, p. 104.

[9] Report on Meat Packing Industry, Summary and Pt. 1, pp. 91, 92 and p. 74, also Pt. 5, p. 86.

	Group	Per cent
I.	Over 25 millions	19.3
II.	10 millions and less than 25 millions	23.6
III.	5 millions and less than 10 millions	13.7
IV.	2 millions and less than 5 millions	15.9
V.	Under 2 millions	12.1
I and II combined		20.6
III, IV, and V combined		14.1

The law of decreasing return is also shown, except for the discrepancy in Group III, which the regrouping would eliminate, as appears from the second part of the table.

In the meat packing business there are five great packers with huge capitals. The independent packers have very much smaller capitals, nevertheless, the rates of return secured by the latter are greater than those secured by the great packers, showing that their capitals are beyond the optimum size. This appears from the following table:

Year	Per cent earned	
	Independent packers	Five great packers
1914	12.6	8.3
1915	13.1	12.8
1916	22.1	18.5
1917	18.1	15.0

The Summary of the Report on milk and milk products, states:[1]

> The most profitable canned milk companies appear to be those having a medium volume of sales. Those companies whose sales ranged from $1,000,000 to $5,000,000 earned a rate throughout the five-year period considerably higher than that earned by companies having smaller sales. Companies having sales above $5,000,000

---

[1] Summary on Milk and Milk Products, 1914–18, June 6, 1921, p. 12.

ranked second in rate of return on gross investment, companies having sales from $250,000 to $1,000,000 ranked third, and companies having sales below $250,000 ranked fourth.

Here all three laws appear quite pure.

The manufacture of farm implements presented many difficulties, but the existence of the law of the maximum rate of return was clearly shown:[2] "In respect to the implement business, excepting the years 1913 and 1914, the smallest companies (not exceeding $1,000,000 investment) generally made a higher rate of return on investment than the larger companies and also their rate of return generally exceeded that of the International Harvester Company."

In the beet sugar industry,[3] many causes prevented the commission from making a statement in figures; but it says that there was no doubt in the opinion of those most conversant with the industry that there was an optimum size, but there was some difference of opinion as to how large the capital of such an optimum size was. In the opinion of one expert who is quoted at length, it is mentioned that the optimum size was quite small. This expert considered the plant of 450 tons capacity as the best size.

A very similar condition is shown to exist in the manufacture of canned foods.[4]

As for the steel business: "Some of the most successful concerns in the steel industry outside of the U. S. Steel Corporation, show higher rates of return upon their total investments."[5] The rate of return in the case of the latter averaged only 12 per cent for the first ten years of its existence, even on the low basis of property valuations of the Commissioner of Corporations.[6]

---

[2] Report on The Causes of High Prices of Farm Implements, May 4, 1920, p. 109.

[3] Report on Beet Sugar Industries in the United States, May 24, 1917, p. 177.

[4] Report, May 15, 1921, pp. 1, 2.

[5] Report of the Commissioner of Corporations, p. 343 of Pt. 1.

[6] Ibid., p. 342.

The same results were obtained by the Federal Trade Commission when it investigated the rates of return for the War Industries Board. While the detailed statements have not yet been published, the essential feature is known, namely, that the "independents made as large or larger rates of return as the Steel Corporation." [7]

3. The three laws hold in agriculture; moreover, the knowledge that they do has been possessed by practical farmers all over the world for thousands of years.[8] "When the conditions affecting the agriculture of a region have remained stable for a considerable period local agricultural practice tends to become approximately what it should be for the best results." [9] Therefore, examples for the law of increasing rate of return can be had in abundance. Examples for the law of decreasing returns cannot be had so easily for the reason stated above. But in Bulletin No. 341, page 66, there is a table which shows clearly all three laws.

INCOME ON CAPITAL ON 378 OWNER FARMS, CHESTER COUNTY, PA.

Area groups, acres	13–40	41–60	61–80	81–100	101–120	121–160	Over 160
Per cent income	10.4	13.5	13.2	12.7	12.5	12.6	11.8

The maximum rate of return is realized on a farm from between 41–60 acres. The two other laws are shown here with almost ideal purity. The general remarks of the authors on the subject of this paper are so lucid, so happily expressed, that they may well be quoted.[1]

> As will be seen in what follows, there appears to be under given conditions, a most profitable magnitude for many of the enterprises of these farms. Within certain limits, which can usually be ascer-

---

[7] P. W. Garret, Government Control over Prices, p. 398.

[8] This is shown in detail by Gustav Schmoller, Grundrisse der Allgemeinen Volkwirthschaftlehre, Pt. 1, pp. 470, 471.

[9] Bulletin No. 341, W. J. Spillman and others on the Farm Management Practice of Chester County, Pa.

[1] Attention is also called to the passages just preceding and following the quotation. They contain concrete illustrations of the views expressed in the quotation.

tained by farm-management survey methods, a farm enterprise may add materially to the profits of the farm business, while if the enterprise be made either smaller or larger than this the profits are reduced. Generally speaking, the farmers in the older settled agricultural sections have arrived at this optimum magnitude for the various enterprises they maintain on their farms. But they have done this in response to the action of obscure economic forces which are not clearly perceived. Hence many of them make mistakes in the matter of relative magnitude of the enterprises they maintain.

Some additional examples, mostly for the law of increasing returns, will now be given. Bulletin No. 651, on Anderson County, S. C., by A. G. Smith:

Crop acres per work animal	11 or less	12–15	16–19	20–23	24–27	28 or more
Per cent on investment	2.64	3.30	3.67	4.32	3.62	2.86

The maximum rate of return is 4.32 per cent on 20–23 acres. This example shows the three laws in absolute purity.

Bulletin No. 659. R. E. Willard on Ellis County, Texas, page 29:

Size of farm	80 acres or less	81 to 120	121 or more
Per cent on investment.......	6.0	6.4	6.4

From same Bulletin No. 659, page 41:

Acreage in cotton	25–63	63–72	72–76	76–82	82–99
Per cent on investment.....	5.8	5.9	6.1	6.8	6.9

Bulletin No. 694. H. M. Dixon on Lenawee County, Michigan, page 21:

Capital	$7,000 or less	$7,001 to $11,000	$11,001 to $15,000	$15,001 to $20,000	Over $20,000
Average labor income	$276	$386	$488	$569	$1139

Bulletin No. 716. H. W. Hawthorne on Washington County, Ohio:

Investment	$3,817	$4,860	$7,807
Per cent on investment.........	5.4	7.2	9.5

Bulletin No. 848. W. C. Funk on Small Farms near Washington, D. C.:

Capital	$2,747	$6,430	$7,451	$8,636
Rate of return	1.3	3.0	8.5	14.0

The law of increasing return shows.

Bulletin No. 941. H. M. Dixon and I. M. Purdon on the Ozark Region in Missouri:

Capital	$3,832	$4,631	$7,133	$8,937	$12,602
Rate of return........	0.3	1.4	4.2	6.5	9.7

The above is a combination of the two tables contained in the Bulletin entitled *Rolling and Hilly Farms* and *Valley and Level Upland Farms*. While the two cases undoubtedly differ in regard to the size giving the maximum, the tables themselves do not establish it. The combined table just shows the law of increasing returns.

Bulletin No. 603. E. A. Boyer on Green County, Wisconsin, and Kane County, Illinois, page 13.

There are two interesting tables on dairy farms. The author thinks that Table VIII shows the profit in relation to the kind of dairy products sold. But, rearranging it according to the size of the capital, the law of increasing returns is shown. It is, therefore, possible that his results prove really nothing as to the relative advantage of the kind of dairy products sold. The rearranged table is as follows:

Capital	$22,496	$29,879	$33,609	$37,794	$37,977
Per cent on investment.....	3.3	3.9	4	4.6	4.6
No. of farms investigated...	3	49	32	33	26

Again the next table, Table IX, is supposed to show that frequently the deciding factor in reference to profits on dairy farms is the fact whether the cows are grade or pure bred. Rearranging the table according to size of capital we have:

Kind of Cows	Mixed or other grade	Grade Holstein	Mixed or other grade	Part pure bred Holstein	Grade Holstein	Part pure bred	Pure bred
Capital...............	$20,689	$30,652	$35,301	$38,279	$39,542	$41,318	$42,615
Per cent on investment.	2.8	3.6	4.8	3.7	4.6	5	5.7
No. of farms...........	10	62	22	3	34	9	3

In both tables the columns of three farms should be omitted. This is too small a number for secondary data. If this is done the table just shows the law of increasing returns and does not support the author's conclusion.

Bulletin No. 735. S. B. Nickols and E. L. Currieron, on Sugar Beets in Billings region, Montana, page 36:

Acres	5 or less	6–10	11-15	16–20	21–30	31–40	41–50	51–60	Over 60
Profit per acre..	$0.34	5.78	6.87	8.05	13.19	12.28	13.92	13.39	11.37

This table shows all three laws with only one discrepancy, that from 31 to 40 acres, which probably could have been smoothed out by a smaller grouping.

These examples show that in every industry there is an optimum size, which, however, is not necessarily the same for successive years. The phenomena of increasing and decreasing returns follow from it as a mathematical necessity. But in this respect the examples have shown certain discrepancies which require a further explanation: The most exact, the most advanced of all sciences are astronomy and physics; but even there the primary data are not taken at their face value. They are analyzed, corrected, and some of them, if need be, rejected. A similar investigation is quite possible in the case of economics.[2] If extraordinary conditions surround the operations of a factory, its primary data may be corrected accordingly before they are averaged with the data of other factories. If this had been done in the Reports and the Bulletins the discrepancies would not have appeared.

The optimum size of capital is different in the different industries, because it depends, among other things, on the technical stage of development of that industry. The highest size seems to be in the railroad business, about a billion dollars. A profession is a business in which the

[2] E. g., on page 413 is shown how to adjust the primary data on capital before using them to form the secondary data.

optimum size is insignificant. In agriculture it is obviously small, but in dairying and allied industries it may be considerable. The optimum size is of profound importance in every respect, but this cannot be shown here in detail.

4. Our next task is to ascertain the facts as to the difference in the cost of production of factories engaged in the same industry.

The publications of the Federal Trade Commission show great differences in the costs of production of different producers of the same article. The cost of producing copper in 1918 ranged from less than 12 cents a pound, to more than 26 cents a pound; producing a ton of bituminous coal in the southwest field of Pennsylvania from $1.16 to $4.67; raising a twenty-month old steer for the market from $52.18 to $77.09; making book paper from less than $55 a ton to over $90 a ton. That these large differences actually form the structure of every industry and are not isolated instances appears from the following table,[3] showing in detail the structure of the newsprint paper manufacture in the United States in 1913.

	Number of mills	Produced tons	Per cent of total
Less than $27	2	169,548	18.0
$27 and less than $30	3	82,773	8.7
$30 and less than $33	1	75,290	8.0
$33 and less than $36	8	214,678	22.7
$36 and less than $40	17	361,602	38.3
$40 and over	2	40,472	4.3

The average cost per pound of producing sole leather in four *efficient* tanneries in 1914 was, in cents, 21.3, 23.6, 28.9, and 32.2; so that the last has a cost of 50 per cent higher than the first.

---

[3] Report on the News Print Paper Industry, June 13, 1917, p. 91.

The most interesting data refer to the steel industry.[4] The ranges of the costs of production for the commodities named are as follows: Beehive coke, from $2.93 to $11.45; pig iron (basic), from $18.44 to $45.72; ingots (open hearth), from $30.60 to $66.34; structural shapes, from $45.54 to $76.79; plates-sheared, from $46.30 to $82.25; merchants bars, from $44.82 to $87.15.

The report of the Commissioner of Corporations on the steel industry contains many other illustrations[5] taken from the books of the U. S. Steel Corporation for the year of 1910. The average costs of ore per ton for three Lake districts, consisting of 43 mines, were as follows:

District	Cost	Labor	Supplies
Mesabi range	$1.05	0.21	0.11
Vermilion range	1.45	0.57	0.30
Michigan range	1.89	0.91	0.30

The cost of production differs even in the different mines of the same district. In the first two districts, the costs in the different mines vary from $0.56 to $2.96. In the Michigan district, the costs of production in the different mines vary from $1.39 to $5.64.

The corporation has 21 furnace plants in which it makes Bessemer pig iron. In the 15 furnaces of the Lake district "the cost above material — the most significant figure — ranged from $0.79 per ton to $2.75 per ton."[6] The total costs in the different plants range from $9.00 to $14.00.[7]

In ingots the same differences are shown on the whole, in each item and in each of its thirteen plants. The main differences are here in the pig iron, the raw material cost. But the works cost above material, also show substantial differences, being from $0.93 to $2.40.

---

[4] P. W. Garret, Government Control over Prices, published for the War Industries Board, p. 404. The details of the tables are most illuminating, but cannot be given here.

[5] Pt. 3, pp. 182 ff.

[6] Ibid., p. 411.

[7] Ibid., p. 412.

Having established that differences in the costs exist, examples will now be given showing that the costs decrease if the size of the capital (or of the operations) increases.

Bessemer Pig Iron, Steel Report, Part 3, p. 403.

Tonnage group	Under $150,000	$150,000–300,000	$300,000–450,000	$450,000–600,000	Over $600,000
Average cost above material	$1.75	$1.32	$1.05	$0.99	$0.95

Basic Pig Iron Report, Part 3, p. 413.

Tonnage group	Under $150,000	$150,000–300,000	$300,000–450,000	Over $450,000
Average cost above material....	$1.36	$1.02	$0.98	$0.97

Bessemer Billet Ingots, Report, Part 3, p. 426.

Tonnage group	Under $150,000	$150,000–300,000	$300,000–450,000	Over $450,000
Average cost above material	$1.91	$1.53	$1.11	$1.09

Iron Ore, Report, Part 3, p. 388.

Tonnage group	Under $500,000	$500,000–1,000,000	$1,000,000–1,500,000	$1,500,000–2,000,000	Over $2,000,000
Average cost.....	$1.36	$0.68	$0.58	$0.65	$0.57

Mesabi Range Underground and Other Mines

Tonnage group (gross tons)	Mines	Av. cost
Under 200,000	7	$1.37
From 200,000 to 400,000	4	1.20
From 400,000 to 600,000	2	1.21
From 600,000 to 800,000	1	1.23
Over 800,000	1	.95

Old Range Mines

Under 200,000	10	2.02
From 200,000 to 400,000	5	1.69
From 400,000 to 600,000	2	1.52
Over 600,000	1	1.79

In view of the small number of mines another grouping would have been preferable, as it would eliminate the small discrepancies.

It is important to know that not only the total cost of production decreases, if the capital increases, but that every constituent part of the cost decreases as appears from the following examples: Defining as large plants in the canned food business, those that pack over 50,000 cases; and as small ones, those of less than 50,000 cases a year, the costs in the large and small ones compare as follows: [8]

Items	1916		1917	
	Large plants	Small plants	Large plants	Small plants
Number of plants	17	52	40	41
Number of cases packed	1,818,387	1,364,303	4,046,639	1,175,874
Cost of raw fish	$1.077	$1.456	$1.494	$2.024
Cost of containers	.803	.865	1.153	1.345
Labor costs	.618	.750	.648	.996
Other expenses	.993	1.040	1.007	1.316
Cost of production, excluding raw fish	2.414	2.655	2.808	3.657
Total cost of production, excluding selling expense	3.491	4.111	4.302	5.681

In the case of factories that produce a variety of grades and sizes of articles, the concept of the operating ratio [9] permits a comparison of the costs of production. This is not done in the Reports, but the profit is sometimes figured as a percentage of the cost. It is obvious that the former increases, if the latter decreases; therefore the following tables may well be quoted: [1]

[8] Report on Canned Foods, December, 1918, p. 46.

[9] The great importance of the operating for allied problems cannot be shown here.

[1] Report on Shoes and Leather Costs and Prices, June 10, 1921, p. 103. A similar table for tanneries is on page 165.

Sales and Profits of Shoe Manufacturers

Group	Profit on cost of production	
	1918	1919
Over $3,000,000	7.8	13.6
$1,000,001 to 3,000,000	6.4	12.2
$250,001 to $1,000,000	5.3	10.7
$100,001 to $250,000	5.3	8.8
Under $100,001	4.1	6.7

In agriculture the same phenomena holds; not only the total cost, but also each constituent part of it is smaller in the case of a farm with a larger capital. In Bulletin No. 341, Table 27, page 60 shows:

Sizes of farms in acres	Productive work units per farm		Crop acres per man	Man labor per crop acre	Value of labor per month per man	Crop acres per work horse	Work horses per man	Value of machinery per crop acre	Ratio of cost buildings to farm income	
	Man	Horse							Dwelling	Other buildings
13 to 40	184	82	13.7	$20.74	$23.93	9.0	1.5	$15.11	3.41	2.78
41 to 60	299	140	20.2	15.78	26.60	11.9	1.7	12.57	2.19	1.91
61 to 80	372	177	23.2	13.98	27.12	13.9	1.7	11.92	1.88	1.89
81 to 100	475	226	25.2	13.46	28.30	14.5	1.7	10.79	1.76	2.03
101 to 120	551	259	25.6	13.64	29.22	15.0	1.6	11.80	1.83	1.92
121 to 160	582	286	29.0	11.80	28.50	16.8	1.7	9.20	1.62	1.83
160 plus	856	444	31.1	13.05	33.77	17.4	1.8	8.94	1.68	1.91

As a matter of fact no examples should be needed to prove that the costs decrease with the increase in the capital. There is no difficulty in reducing the cost in any factory, if additional capital is made available, by the installation of additional labor-saving machines; because there is no difficulty inventing, if necessary, new labor-saving machines. The difficulty lies only in the fact that the cost of them will reduce the rate of profit on the whole capital, if the saving due to their introduction amounts to a rate on their purchase price, which is smaller than the return on the investment before they were installed;[2] a point which obviously has an important bearing on the emergence of the optimum size.

There is another way of reducing the cost of production, which will be stated, but its consequences will not be further considered. In all that has gone before we have tacitly assumed that we were dealing with a factory. If, however, we considered a plant (that is to say a combination of several factories owned by one party), then there is an important case in which the size of the main factory remains at the optimum size; but its cost of production is materially reduced by the ownership of another factory, which furnishes it the raw material, an ownership which is called vertical integration. Take for instance, two producers of pig iron. Suppose that their blast furnaces are identical in every respect, are located side by side, so that all items of labor and transportation are the same for both. But suppose that producer A buys his ore, while producer B owns ore lands and uses his own ore in the manufacture of his pig iron. It is obvious that the cost of ore for producer A will be greater than that of B, because A pays the *market price* for ore. On the other hand, when producer B figures his cost of production, he will add to his *cost of producing his ore* the cost incurred at the blast furnace.

The actual figure taken from the Steel Report[3] will illustrate the matter:

Cost of producing a ton pig iron by Steel Corporation-B	9.71
Allocated profits on anterior operations	4.18
Cost of production of producer, A, who pays market price of ore ..	13.89

A vertical integration has the purpose of furnishing cheap raw material to the factory and thus it reduces the cost of production. But what the rate of return on the

---

[2] The exact formulation of this will be given as part of the theory.

[3] Pt. 3, p. 396.

total capital is in this case will not be investigated here. The great differences in the costs of production in the steel business, shown above, are partly due to such integration. We have one completely integrated plant in the U. S. Steel Corporation. The others buy, wholly or partly, their ore, or their pig iron, or their semi-finished product, so that there are no two plants that are integrated just to the same degree. The two main causes for differences in cost are, therefore, differences in size, in the case of factories; and this together with integrations, in the case of plants. But as the degree of integration, like that of size, shows itself in the size of the capital, we are justified in saying that the cost of production depends on the capital employed, in a manner, however, which is quite complex, if the vertical integration is also taken in consideration.

In conclusion, it will be shown presently that the investment in the tools of production, per unit of product, is the smaller, the greater the capital is. The above table from Bulletin No. 341 contains also some examples.

5. What causes bring about the emergence of the optimum size? The large-scale producer has very little advantage in securing his raw materials because most of them are either traded on exchanges or have such a well-known market price as to put him on a parity with the small-scale producer. He has very little, if any advantage on the marketing side, because the small-scale producer need not depend so much on others, nor on costly statistics and records. The source of the law is found on the producing side. The cost of production decreases, but at the same time an opposing force is set in motion and the result of both is the emergence of the optimum size.

Man's unaided capacity for labor is very small and limited in a great many respects. For instance, he can neither lift a great number of pounds, nor can he lift it to a great height. In order to increase his capacity, man employs tools. A rope and a pulley enable him to vastly increase the load and the height of the lift. A relation exists between the cost of a tool, its size and the increase in capacity which it makes possible: It is as follows: *The larger the size of a tool, the smaller is its cost per unit of capacity.*

Take for instance, the casks and tubs used so extensively in many lines of business. The capacity of a tub to hold a fluid is proportionate to its volume, but its cost depends on the amount of lumber it contains and is, therefore, proportionate to its surface. A barrel of twice the capacity does not contain twice the amount of lumber (or twice the surface) but only about 40 per cent more, so that an increase in price of 40 per cent purchases an increase in capacity of 100 per cent. Consequently, a cubic foot of capacity costs less the larger the barrel is.

Exactly the same applies to a great many other tools, or fixed commodities, like warehouses, freight cars, steam boilers, and engines. In all these cases the result emerges from the fact that the capacity of this group of tools depends on one property (on the volume) while the cost depends upon another property of the tool (on the surface) and that, according to a theorem of solid geometry, the volume of a body grows faster than the surface if the linear dimensions are increased.

In the case of other fixed commodities, two other physical properties give rise to the phenomena. For instance, the capacity of iron bars to resist pressure or to carry weight depends on one of its properties, its resistance or elasticity. The cost depends on another property, roughly, on the weight. But physicists show that their elasticity increases much faster than the weight, and, therefore, the carrying capacity per pound costs the less the larger the size of the bar.

In general, it will be found that the property of a fixed commodity in virtue of which it increases man's capacity for the work is not the same as the one determining its cost and that the former increases much faster than the latter if the size of the tool increases.

Other, but similar relations show in the case of the steam engine. The cylinder walls are a source of loss of heat to an enormous extent. But the cylinder walls, the surface of the cylinder, increase slower than the volume, or the capacity of the engine. Therefore, the loss due to it is comparatively smaller in a large, than a small engine. The consumption of coal per horse power per hour is three pounds or even more in small, two pounds in large, and only about one pound in the enormous marine engines. In most manufactures the expense for coal constitutes from 10 to 20 per cent of the total cost of production and the tremendous advantage of the larger tool, the larger engine, would in itself prove the existence of one of the two opposing forces.

A similar result is seen in the dynamo electric machine. This is a machine which transforms mechanical energy into electric energy. The transformation is accompanied by loss of energy due to a great variety of causes. Among others a part of the mechanical energy is converted into heat in the armature and the electromagnet, a part is lost in friction in the brushes and the bearings, and a part sets up electric currents in the machine which cannot be utilized. All these losses can be figured and the formulae based on the laws of electricity and mechanical energy clearly show the relative advantage of larger machines.

The tools of railroads consist of rails, cars, and engines. The saving due to larger engines has already been noticed. Heavier rails decrease materially the cost of maintenance, larger cars can be handled more economically than smaller ones. A larger mileage is operated more cheaply than a smaller one, as the general expenses per mile decrease.

So much for the force which is the source of the law of increasing return. Now we must investigate the force which opposes it and ultimately overcomes it so that as the result of both the law of the maximum rate of return, and ultimately that of the decreasing return, emerges.

Every tool has a property in virtue of which it increases man's capacity to labor, as shown above. But it has many other properties, and one or some of them set up disadvantages wholly disconnected with the capacity under investigation. For instance, a lever increases man's capacity to lift weights, and the more disproportionate the two arms are, the greater is the increase in the capacity. There is no limit to this. When Archimedes said he could lift the earth from its hinges if only he were given a fulcrum for a huge lever, he was right, theoretically. But practically he was quite wrong. Unfortunately a lever has weight itself. This is disregarded in the law of the lever in physics, but cannot be disregarded in economics. The longer the lever, the heavier it gets, and at last a length is reached beyond which it becomes unmanageable to man. A similar condition exists with rope and pulleys, where at last the friction counteracts all theoretical advantages. And the same holds good in the most complex factory. The occasional stoppages of a factory with huge machines, are much more costly than those in two factories with smaller machines. Moreover, there are innumerable such forces that no one can foresee, and which only experience brings to light. The American Tobacco Company was very successful in large-scale production of cigarettes and chewing tobacco, but when it applied it to that of Havana cigars, it was a total failure for causes which nobody could foresee, and the plants had to be disintegrated into their original units.

The many attempts at large-scale production in the straw board manufacture proved failures. The largest electric city lighting plant cannot always underbid the small plant of an office building, because the exhaust steam can be used for heating purposes there. In regard to railroads, the late Mr. E. H. Harriman has given the following explanation:[4]

> Did you ever ride in the cab of one of the modern freight locomotives? Well, you probably noticed the swaying back and forth that accompanied the drive of the pistons. That meant that the centre of gravity had crept up just about as high as it could go without having the engine topple over when it got into action. It told you that we had gone as far as we could in building engines up into the air. Now, if you will think a minute you will see that there is obviously a limit in length of fire-box beyond which it is impossible to fire an engine. And we have reached that limit as well. So there you are. If we increase our car capacity we increase the unproductive dead weight that is to be drawn disproportionately to the increase of the load, and in so doing we are making demands upon tractive power that has already reached the limit of its development.

In downtown office buildings, the number of elevators increases with the height of the building. But they cause a waste in the rentable space. For this and other reasons there is a certain height of an office building which gives the maximum rate of return. In St. Louis it is believed that a twelve-story steel, or an eight-story reinforced concrete building gives the best results. In transportation, the length of the railroad depends largely as to how far bulk need not be broken; therefore, the roads still extend only from the Atlantic coast to the Mississippi river, because as yet there is not enough through traffic for a single road from coast to coast.

---

[4] The Financial Chronicle, March 23, 1907, p. 660.

In blast furnaces[5] large size has many advantages: economy of installation, of labor, and administration per unit of product, and the fact that the proportion of the heat-wasting surface increases much slower than the contents, due again to above geometrical law. But here, too, other properties, disadvantages, exist that grow apace, faster at last than the advantages, so that a limit is reached. The width at the bottom is now generally 12½ feet, and the most economical height is considered to be 80 feet. These results have only partly been ascertained by an investigation of those many countervailing problems, they are largely the result of experience.

In agriculture it is easily seen that there is an amount of labor that will yield the maximum. The purpose of plowing the land, and even of most of the fertilizers, is to put the surface of the land in the proper *physical* condition so as to permit the free passage of water and air. If the soil is not broken up at all, neither water, nor air can freely enter. If so much labor is expended as to break up the soil into such small particles as to permit it to coalesce on its own accord, the impenetrable surface restores itself. Between these two extremes, both yielding zero, as it were, there is an amount of capital and labor that will put the soil in just the best shape to permit the free passage of water and air, and that amount of labor will yield the maximum return.

There are a great many additional causes for the emergence of the law. With the increase in the size, labor per acre is less, less horses are needed, less machinery, altogether a smaller capital per acre, less for building, less for fences. But the countervailing influence also grows with the distance of the farmhouse from the different parcels of land, as Schmoller[6] has already pointed out.

[5] Encyclopedia Britannica, art. Iron and Steel. In the Steel report, Pt. 3, p. 80, a similar view is stated.

[6] Loc. cit. See also G. F. Warren, Farm Management, pp. 264, 265, and particularly chap. VII, where a wealth of data on the optimum size all over the United

But even here, as in industry, the scientific study of this problem has not succeeded in illuminating all obscure points, and we are still largely guided by experience. Agriculture, being an old industry and being practiced by millions, has naturally an enormous fund of experience, and every district may well be relied on to know the optimum size. For instance, as regards the farms in the Ozarks, the following statement is made:[7]

> The operation of a general farm with much less than forty acres of land for crops is exceedingly unsatisfactory, regardless of the location of the farm, whether among the valleys or among the hills. Size of business is an important factor in farming throughout this area, but it is also true that the limit to the number of acres of crops which can be profitably included in one farm by the average operator is reached more quickly with farms of rough and stony character than in the case of farms with land more easily cultivated, and perhaps this limit has been reached by some of the larger hill farms.

II. THE THEORY

1. At the outset we must adapt the present laws of diminishing and increasing returns for our purposes. The customary way of showing their emergence is as follows:

Take *one* and the same piece of land and employ on it two or more ever-increasing amounts of capital in *two* or more successive years. The successive crops will exhibit the laws of increasing or decreasing returns as the case may be. In this manner of treatment only the physical quantities of the successive crops can be compared because as Marshall puts it:[8] "It is important to remember that the return to capital and labor, of which the law speaks, is measured by the amount of the produce

---

States is to be found. On the influence of distance in the case of cattle production, see Bulletin No. 588, J. T. Tardine, pp. 10, 11.

[7] Bulletin No. 941, H. M. Dixon and I. M. Purdon, p. 14.

[8] Marshall, Principles, p. 229.

raised, independently of any changes that may *meanwhile* take place in the price of produce." For instance, if the returns are 25 bushels the first year, and 20 bushels the next, they would exhibit a law of diminishing returns. But if the prices per bushel are $1.00 and $1.50 respectively, so that the values of the crops become $25 and $30 respectively, the values would vitiate the emergence of the law in that they would show in this case an increasing return; and if several years are taken the values would show ordinarily no law of any kind. If we lived in a world in which prices did not change, but remained always the same, the values would exhibit identically the same laws as the physical quantities; because the proportions between the figures of a series do not change, if each figure is multiplied by the same amount. If, for instance, the successive crops are 25, 20, 16, 13, 11, and the unchanging price is $2, the series of the values would be $50, $40, $32, $26, and $22; and would exhibit the same law of diminishing returns as the series of crops measured in bushels.

The disadvantage of this customary method of showing the emergence in physical quantities lies in this: Our account books show values in money, and not physical quantities in bushels. Therefore, there are neither experiences nor experiments available to prove these laws, and the text books contain only schematic figures.

There is, however, a second manner of showing the emergence which obviates this serious drawback.

Take *two* or more pieces of land of identical quantity and quality — which can easily be done by dividing one piece into two or more equal parts — and employ on it in *one* and the same crop year, two or more increasing amounts of capitals. The price per bushel of the crops on the various plots will of course be the same, there is no "meanwhile" here at all, so far as these various crops are concerned; a bushel of the crop on the first plot is worth identically the same as a bushel of the crop on the second, or third, or any other plot; neither the inequality of the seasons, nor any other change will differentiate one plot from another; in brief, the time element as the cause of change is entirely eliminated. The only thing that differentiates one plot from another is the difference in the capitals employed on them. Any law that is exhibited by the quantities, will also be exhibited by the values of the crops.

Moreover, an additional concept will be introduced. The customary schematic illustration of the laws of returns is best shown in a table of three columns. The first contains the increasing series of capitals, the second the produce, the third the differences of the figures contained in the second column and which are assigned and allotted to the differences in the figures of the first column, to the successive "doses" of capital. Here we shall add a fourth column. It will contain in each line the produce per unit of capital, or rather per hundred dollars of capital; in other words the *rates* of return, the rates of profit, realized on these various capitals. In their nature each figure in the fourth column is a ratio of the two figures on the same line in the second and first columns respectively, expressed in per cent. This fourth column is so important for our purposes that we have frequently omitted the second and third columns and just show the comparison of the capitals and the respective rates of profit realized on them.[9]

Economists have constructed another pair of laws of returns based on tendency, on time. A law of decreasing returns is supposed to hold in time for agriculture, and one of increasing returns for industries. The results obtained are wrong, or as Marshall expresses it "unsatisfactory." [1] He also suspects the source of the error, namely, that the concept of a supply curve in *time* has three, and not two dimensions, and those theorems based on a descending supply curve are obviously invalid.

---

[9] Marshall, Principles, p. 231 n. gives an experiment on four plots. Carver, Distribution of Wealth, p. 58, Table A, omits col. 3 and shows col. 4. Taussig, Principles, vol. ii, pp. 57–59, treats the problem of rents in both manners, but none recognized that in the second manner of treatment the values instead of physical quantities may be taken, and thus the financial statements of businesses be used in support of the theories.

2. It has been shown that larger capitals permit a smaller investment per unit of production for every constituent part of the capital, if the tools are of *larger* size. Nothing has been said what the result would be, if the larger capital is used, not for larger tools, but for a greater number of tools of the same size. What would be the result, e.g., if a factory of $200,000 just duplicates the appliances of a factory with a capital of $100,000; in other words, if the larger capital consists in more, but not in larger tools than that possessed by the smaller capital.

Two engines of one horse power each can do pieces of work which one engine of one horse power cannot do, and similarly with two laborers. A factory with twice the working capital can accept orders which the smaller one must refuse. If the times are dull, this is indeed an advantage. But here we suppose normal times, that is to say a condition in which the business offered equals the capacity of the factories. Therefore, there is no advantage in this feature at all.

If, however, we define a larger capital to mean larger tools, then the examples show that not only is the investment per unit of output smaller in the case of larger capitals, but that the cost of production of larger tools, of larger capitals is smaller. Under the term larger capital, we shall mean one consisting of larger tools and not one of more tools of the size of the smaller capital.

---

[1] Marshall, Principles, p. 519, and note p. 520.

For capitals thus defined the following law of increasing rate of returns holds for every constituent part of the capital:

In every production, each of the constituent parts of the capital exhibits a law of increasing returns, in that its successive doses earn an increasing rate of profit.

The interaction of the different constituent parts of the capital forms a barrier which brings this increase in the rate of profit to a dead stop at a certain point. Take again the case of working capital, particularly raw material. There is an interaction between it and the fixed assets. The latter can work up into finished products only a certain, clearly determinable, amount of raw material. If there is more of the latter then this amount of the capital invested in it is "dead," it gives no return at all. Up to that point the successive doses of the capital invested in raw material exhibit the law of increasing returns. Every further dose shows no return whatsoever, and similarly with all other constituent parts of the capital. Therefore, the manufacturer will be careful to invest his capital so that not a single dose of any of the constituent parts of his capital shall be "dead." If his doses are $100 each he will in making the plans for his factory gradually allot it to that constituent part which in virtue of the increasing return yields the highest rate and is not yet checked by its relation to the other parts. If he has done this planning well, the completed factory will exhibit such an interaction of the constituent parts of the capitals as to result in the following law:

In a properly arranged business the rates of profit on the marginal doses of all the constituent parts of the capital are equal, and this gives the maximum rate of profit on the whole capital.

This is obvious. If a marginal dose would give a higher rate, if taken from one and invested in another constituent part, this of course would be done. The business man desires to make the maximum rate of profit on his capital and the above arrangement gives him a higher rate than any other.

The above law of production that there is an arrangement of the constituent parts of a capital which gives the maximum rate and that this stage is characterized by the equality of the rates on the marginal doses of the constituent parts, is a counterpart of Gossen's celebrated law which holds in consumption.

G. F. Warren [2] gives a happy illustration of the emergence of the law. He pictures a bucket that has staves of different lengths, each stave represents the marginal rate of a capital item. The profit is presented by the water the bucket contains. Of course the volume of the water it can hold, the profit it can yield, is determined by the shortest stave. The additional lengths of the other staves contribute nothing to the volume of water, to profit. The maximum return is reached if the marginal rates, the staves, are equal. The above law is one of the many cases of parallelism existing between the phenomena of production and those of consumption, but they cannot be given here.

In view of this interrelation it is clear that if one component part of the capital is known, or assumed, every other component part is determined. If, e. g., the size of the factory's engine is known, the size of the building, the amount of the working capital and every other component part is determined if the factory is to be subject to the law of equilibrium.

In the last twenty years the recognition that some balance exists between the constituent parts of a capital has gradually evolved, particularly in the writings of

---

[2] Farm Management, p. 171.

T. N. Carver,[3] but the parallelism with Gossen's law has not been noted, nor its exact formulation.

If, then, we compare with each other the returns on equal capitals engaged in the same business we shall find great differences. Those whose constituent parts conform to the above law will yield the maximum rate of profit. The rate will be the less the more the parts deviate from above equilibrium. Two capitals in the same business, both of which are invested in items in equilibrium, will yield the same rate. If all parts except one are in equilibrium and that one increases toward the equilibrium and beyond, the rate of profit on the whole capital will increase till the equilibrium is reached and decrease thereafter.[4] This is most frequently seen in the case of working capital. In a new country farmers have very rarely a sufficient amount of it, or what comes to the same thing, the amount invested in land is too large as compared with the balance, the working assets. The same holds in old countries particularly where a metayer system prevails. The temptation of the tenant to lease too much land for his capital seems irresistible. The optimism of the business man does not, and cannot prevent the proper investment in fixed commodities, but it frequently induces him to attempt business with insufficient working capital; and this results in returns of less than zero, in other words, losses. Insufficient working capital is the main cause of manufacturing, commercial, financial, and agricultural failures. Many violate the law in the beginning, particularly in farming. In industries the start is usually in accordance with the law of equilibrium with a sufficient amount of working assets. But, "by an optimism due to rising prices and the hope of great profits through increased production," the working capital is gradually converted into fixed assets and the deficiency borrowed from the banks, and this is, if done on a large scale, the first step towards a condition of crisis,[5] because if the loan has to be paid when prices are deflated, the deficiency of working capital becomes obvious and the business goes on the rocks.

---

[3] See also Arthur S. Dewing, "The Law of Balanced Returns," American Economics Review, 1917, pp. 755 ff.

[4] This phenomenon has been magnified into the original and principal source of the laws of increasing and decreasing return. Marshall, Principles, p. 230.

It may not be out of place to call attention again to the fact that the laws of return used here refer to the fourth and the second, but not to the third column of our schematic representation. The second column shows that the returns *increase*, the third column shows that while they increase, the increase is getting gradually smaller. Here this phenomenon, based on the second column, is called a law of *increasing* returns. In the present economics literature the phenomenon, based on the third column, is called a law of *decreasing* returns. In the terms of mathematics, our description refers to the ordinates of the function, or to their ratio to col. 1, which are given in col. 4, and they increase indeed; the present customary formulation refers to the differences of successive ordinates, and these differences become indeed smaller, the nearer we come to the maximum. The new form is simpler, and as the results show, more fruitful. Finally: Both formulations are directly the results of the existence of a maximum.

In general, a factory that has grown piecemeal is of necessity poorly balanced. This is well known to business men.

The task of building a factory with a certain capital so that the proper equilibrium may exist between the constituent parts is not a simple one. The number of items is so great that the task seems almost equivalent to solving a set of difficult equations with several hundred unknown quantities. Besides, some of the forces that enter into the problem are obscure. Therefore, a strictly balanced plant does not exist.[6]

The theories advanced here hold not only for the business of industries, but also in every particular for the *business* of farming. E. g., in Bulletin No. 757[7] there is a clear statement of the loss due to the increase of a component part of the capital beyond the equilibrium. In Bulletin No. 726 [8] is an excellent statement of the difficulty of ascertaining just when the equilibrium is reached.

---

[5] A. Wall in a study of credit criterions, Federal Reserve Bulletin, March 1, 1919, p. 231. This is really self-evident. All gains, all losses impinge upon the current assets.

[6] The same difficulty is encountered by every individual who necessarily tries to arrange his consumption according to Gossen's law. This difficulty is of great importance to the theory of consumption. I believe it explains the emergence of standards of life and also that of ethics.

[7] Hennis and Willard on Grain Farming in North Dakota, p. 10.

3. In what follows only balanced factories will be compared with each other.

It was shown that each constituent part of the capital obeys a law of increasing returns. If then the capital of a factory is larger than that of another, this series of increasing figures is carried further in each of the component parts, in that the whole of the larger capital will yield a larger return not only absolutely, but also relatively, than the smaller one. In other words the rates of return on the invested capitals of different plants engaged in the same industry are the greater the larger the capitals are.[9] This is the old law of increasing returns expressed in a more convenient form.

In the first part a variety of causes was given to account for the fact that the law of increasing returns comes to a stop at the optimum size. As these causes were not known before two other views gained prominence. One was enunciated by Karl Marx. He teaches that the greater the capital the higher the rate of return, the greater the advantage the possessor of the largest plant in any line of industry, so that the smaller plants find it increasingly difficult to maintain themselves, and ultimately a monopoly emerges in every line of industry. Competition disappears. But monopolies are "incompatible with their capitalistic integument" and then "the knell of capitalist private property sounds." [1]

---

[8] Moorhouse and others on Sugar Beets in Colorado.

[9] Even this obvious conclusion from the present law of increasing returns overturns the present theories of profit, which are based on the assumption of a normal, an average rate.

[1] Karl Marx, Capital, English edition of Kerr & Co., vol. i, chap. 32, p. 835. He assigns, however, a different cause for the law of increasing returns.

Thus collectivism will not come suddenly, but as the inevitable result of the limitless law of increasing rates of return.

Another opinion advanced was this: There is no limit to the law so far as the "marketing" side of business is concerned. There is also no limit to the "productive" side, but beyond a certain amount of capital any further increase gives only little further increase in the rate of return. This is the view of A. Marshall.[2] It differs from the Marxian theory only in degree and not in kind. If it were true, collectivism would emerge just as inevitably, but the evolution would take somewhat more time.

The view established here is that in consequence of forces that were described in Part I, there is a limit, and that in virtue of the interaction of those forces with those mentioned before a law of the maximum rate of return, or a law of the optimum emerges, which may be stated as follows:

At every stage of development of any industry the law of increasing rate of returns holds up to a certain size of the capital, which yields the maximum rate for that industry. Beyond that size a law of diminishing rates of returns holds.

It is really only necessary to prove the law of optimum because mathematics teaches, and the customary geometric representation illustrates that every optimum is preceded by a law of increasing and followed by a law of decreasing returns. It is important, however, to note that these laws of return are those of column 4 of our schematic illustration.

The theory of the emergence of profit is, then, as follows:

Profit emerges out of differences in capitals, due to the

---

[2] A. Marshall, Industry and Trade, p. 249. It is inconceivable how from this view he can deduce, as he does, the survival of small businesses.

law of increasing returns, which in turn is based on the superiority of larger over smaller tools, as to capitalization per unit of output, and as to cost of production.

The emergence of profit is not due to capital as such, nor to its productivity, however defined, nor to abstinence, nor to waiting, nor to a preference of present over future goods, nor to great managerial ability, nor to the labor of the manager, nor to that of his workmen, nor to the exploitation of the latter, nor to the institution of private property. This appears from the following three facts:

1. If all the factories in an industry have the same size of capital, none of them make any profit except they form a trust, which is excluded here.[3]

2. If the factories have different sizes, the marginal producers, the producers with the smallest capital, make no profit.

In these two cases all those concepts are, or may be, present; nevertheless, profit does not emerge.

3. In the larger factories of the second case they are, or may be, present at the same rate, nevertheless the rates of profit differ.

There is no normal rate of profit as the older theories assume. Their primary data are correct, the rates differ. But they ascribed the whole of the differences to fortuitous causes and formed a secondary datum by "adjusting" to an equality the primary data, and thus even the differences which were not due to fortuitous causes were extinguished. But it must be stated that economists have already expressed doubts as to the propriety of this procedure.[4]

---

[3] See note on the mathematical theory of competition in the present writer's "Suggestions on the Theory of Value," Quarterly Journal of Economics, August, 1905, p. 583.

[4] Taussig, Principles, vol. ii, p. 123. Differences in the cost of production were always known to exist in agriculture. Therefore it is natural that the first attempt to base on them a theory of profit should have emanated there, namely Ricardo's theory of rent. For its short-comings as well as its connection with the present investigation, see p. 124, ibid.

Karl Marx finds the source of profit in the exploitation of labor. His primary data are quite correct — the labor costs differ, but the manner in which he forms from them the secondary data [5] requires the most careful attention because naturally with its validity stands or falls his whole theory. He first gets rid of the influence of fortuitous circumstances, like occasional idleness or lack of skill. This is quite in accordance with the procedure followed by the exact sciences. Then he notes that there still remain considerable differences in costs. For instance, he points out that the cost of a hand loom weaver is probably twice as great as that of a power loom weaver. We have stopped here and taken these differing costs as our secondary data in the industry of weaving. But Karl Marx does not do that. He says that these differences do exist, but that they are "socially" unnecessary. He thus gets rid of the costs of the small-scale producer and forms his secondary data by averaging the costs of the large-scale producer. His secondary datum for an industry is, then, that there is only one cost, the socially necessary one, as he calls it. But, of course, the label has nothing to do with the contents of the case.

The secondary datum as formed by Marx and used as the basis of his theory extinguishes the most significant feature, namely, that the costs differ. Of course, if we *suppose* that all factories of any industry have the same costs, then profit will indeed not emerge except the factories form a trust and exploit labor as well as the whole public. But this is clear from the beginning, being a direct result of his secondary datum, and there is no further need for thousands of pages to prove it, particularly as it has been known before him. These secondary data describe a condition of society which does not exist under private ownership. It is conceivable, but highly improbable that communism will have nothing but factories of the optimum size in all industries,[6] in which case the costs of all factories will be equal. Therefore, the Marxican theory does not *prove* that we are headed toward communism. It simply *assumes* in its secondary data that a state of communism exists or rather one that may be conceived to exist in communism.[7]

---

[5] Karl Marx, Capital, Kerr edition, vol. i, pp. 45, 46.

4. In a credit operation the relation between borrower and lender is that of a partnership in which one partner, the lender, enjoys certain preferences. They are of a great variety and need not be given here. The lender's share of the profits is called interest.

If a manufacturer goes into business by borrowing just as much as he owns himself, his profit, in virtue of the law of increasing returns, will be more than twice as much as he would have realized on his own money alone. He can, therefore, pay the lender one-half of the profits and still be the gainer. On the other hand, the lender receives also more than he would, if he were to go into business with his money. For instance, if the borrower and the lender went into the manufacture of shoes in 1914, each for himself would have realized 13 per cent. By lending the money to the borrower, and staying out of business, the latter would have made 17 per cent on his money, and would have been able to pay the lender also 17 per cent, so that each would have profited to the extent of 4 per cent. But the lender is not entitled to 17 per cent. He can only expect to receive what he would have made, if he had gone into business himself, namely, 13 per cent. Then the borrower would have made 21 per cent, a gain of 8 per cent. But the lender's $100,000 enjoys some preference over the $100,000 of the borrower, therefore he will be satisfied with less. The exact rate will depend on the nature and extent of the preferences accorded him by the borrower. If the lender is satisfied, e. g., with 7 per cent, the borrower makes 27 per cent, while without the loan he would have realized only 13 per cent. Here is a net gain of 14 per cent, or to put it more expressively, the borrower in virtue of the loan makes more than twice as much as without it, and he makes almost four times as much as the lender.[8]

---

[6] In agriculture this is quite impossible.

[7] Altogether this is a fine example for Secrist's complaint (loc. cit.): "It is secondary data which are generally used and unfortunately too often without a clear idea as to their merits for the purposes in mind."

Interest is the lender's share of the profit, and therefore it cannot emerge from any other source than profit, namely, from the law of increasing returns. The concepts which do not account for the emergence of profit, and which were enumerated above, do not, cannot account for the emergence of interest. More particularly: It is not due to the labor of the manager or of his workmen. The loan enables him to buy larger machines, he does not buy more machines than without the loan. Moreover his labor is measured, not by foot pounds, or any other mechanical means, but by time. With or without the loan he devotes in the example the same number of hours every day to the business of manufacturing shoes. He loses nothing, the increased profit is a pure gain to him. It is also a pure gain to the lender because he is not in business at all. This seems to be in the nature of a miracle, but economics is full of such miracles, as for instance, in the operation of buying and selling, where also both sides gain and nobody loses anything.

If a business man with a capital of $100,000 borrows $100,000, so that there is $200,000 employed in his business, and if he can properly manage this business on $200,000 capital, then it is clear that his managerial capacity is larger than the one needed for a capital of $100,000. Managerial talent is a constituent part of business, but, of course, not of the capital. Nevertheless, the law of equilibrium which holds for the constituent parts of capital may be applied also to managerial talent. And here deficiencies and excesses occur frequently, and it cannot be otherwise under the institution of private property. The manager or owner may be, and frequently is too big or too small for his job. In the above case the manager is too big, or the capital of $100,000 is too small for the equilibrium. The only way to establish a better equilibrium is to borrow the other $100,000, and thus the law of increasing returns is put into motion and yields the pure gain to borrower as well as lender. The lender gives no labor for it, he loses nothing, or to use Warren's illustration, his labor, time, and talent staves have the same length before and after the loan. By increasing it till it equals the former, the bucket, the business, "holds" more profit, although none of the three staves have been increased in length.

---

[8] This is even *after* allowing himself wages.

The size of a loan may be measured in two ways. First, it has an absolute size, in dollars. A large loan, measured thus, can easily be broken up into small ones, and small amounts can be combined into a large loan. These operations need the assistance of a banker, but his charges are part of the expense of raising capital and not a part of the interest payments. The size measured in this way, has, therefore, no influence on the rate from the point of view discussed here, but it is, indeed, influenced by the former in virtue of the laws of price. The second manner of measuring the size of a loan is relative by comparing it with the amount of money owned by the borrower. In other words, the loan is measured as a proportion of the borrower's net assets, and in the case of commercial loans, as a proportion of the borrower's net current assets. The lender is really not interested in the kind of business to which he makes the loan, except as it has a bearing on the safety of the loan. The latter feature has a profound influence on the rate and the smaller proportion the loan is of the borrower's assets the less is the rate. Taking loans of the same relative size the following theorems follow from the differences in safety:

There is no normal rate for loans, just as there is none for profits. A loan to the business of the optimum size yields the minimum rate of interest. The rates on loans to other sizes of business move in the reverse order to that of the rate of profit. They will show a law of decreasing returns where profits show a law of increasing returns and vice versa. The (minimum) rates of the optimum sizes of different lines of business decrease with the increase in the optimum size because their rates of profit increase.

The element of time also has an influence on the rate of interest because time may change the factor of safety. Ordinarily, the rate is the higher the longer the loan runs, as e. g., in the case of farm and building loans. If the safety is not thought to suffer in time, as in the case of nations, and even of public service corporations, like railroads, the rate will be the same, irrespective of the length of the time; as witness the British Consols, the French Rentes, or the 100-year mortgage bonds of some of our trunk line railroads.[9]

The most important effect of time is seen in the difference of rates between commercial loans and "long time" loans. The former is defined as a loan for a season or a shorter time. A commercial loan for the peak of the season commands the lowest rate, one for the whole season the highest rate, but it is ordinarily lower than long-time loans. The peculiar characteristic of the commercial loan is due to the fact that the lender is satisfied with a remuneration which does not equal the agreed-upon rate of the loan for a year, or a season, but only that ratio of it which the length of the loan bears to a year. If, for instance, the loan is for a month, the lender receives only one-twelfth of a year's interest. But every dollar in business realizes the same profit, actual profit (and not pro rata profit), whether it "works" the whole season or only a day.[1] Such loans obviously yield, comparatively speaking, enormous profits to the borrower. For instance, on a 4 per cent loan, that runs only for a single day of the year, the borrower makes more than a thousand times as much as the lender, hence the profound importance of commercial loans for business and the whole economic life of a people.

---

[9] In recent years the borrowing states as well as the lending citizen seem averse to loans running a very long time. The western municipalities frequently make loans for only a limited number of years, and even serially as if they shared the view of Thomas Jefferson, that no loan should be permitted to run longer than the life of a generation, which in Jefferson's time was 21 years.

L. KOTANY.

ST. LOUIS, MO.

---

[1] This is obvious from the definition of capital given, particularly if the Federal Trade Commission had used the highest amount of commercial loans in force during the year instead of the average. Only then can a factory that uses commercial loans be compared with one that does not, or not to the same extent. If this had been done, some of the deviations from our laws would not have appeared in the examples at all. This shows again that the formation of secondary data requires the utmost care and caution.

The phenomena mentioned above show that the element of time enters the problem of profit and interest, but that it is not, and cannot be the cause of their emergence as some of the older interest theories have it. Profit, and consequently interest, are concepts of two dimensions, size and time. This is obvious from the very first line of every profit statement which gives the sales "during the fiscal year." The selection of the year as the unit of time is due to most important economic considerations, and is not purely a matter of practical convenience as Bohm-Bawerk thought. See the present writer's, " Einige Betrachtungen über Bohm-Bawerk's Positive Theory des Kapitals," Jahrbücher für Nationalökonomie und Statistik, July, 1911, p. 88.

ETHICS AND THE ECONOMIC INTERPRETATION

SUMMARY

Bearing on problem of scope and method, 454. — Both economics and ethics deal with value, 454. — Economics as a pure science has given too little attention to separation of constants from variables, 455. — Sense in which wants can be considered as data, 455. — Economic interpretation as a theory of conduct, 459. — Are human motives predominantly economic, 460. — Are they predominantly instinctive, 466. The adaptation theory, 469. — The pleasure theory, 469. — Economics as a study of the adaptation of means to ends, 472. — What becomes of ethics, 476. —Three kinds of treatment of conduct, 481.

CERTAIN aspects of the doctrine of the "economic interpretation" form a natural and convenient avenue of approach to a consideration of the relations between economics and ethics and throw light on the scope and method of both these divisions of knowledge. It is this more general problem which is the object of attack in the present paper, which is not primarily an attempt to make a contribution to the technical discussion of the famous theory named in the title. This theory is useful for present purposes because it suggests the fundamental question as to whether there is really a place in the scheme of thought for an independent ethics or whether ethics should be displaced by a sort of higher economics.

Economics and ethics naturally come into rather intimate relations with each other since both recognizedly deal with the problem of value. Two of these lines of relation are especially interesting in their bearing upon the vexed problem of scope and method in economics. In the first place, the separation between theory and practice, or between science and art, offers special difficulties in this field, for reasons which it would carry us away from our central theme to elaborate here. The unfortunate but familiar result of this fact is that economists have spent much of their energy in disputations as to whether the science is properly concerned with facts and cause-and-effect relations, or with "welfare." In other provinces of science such controversies would seem absurd.

There is another and deeper source of confusion in the conception of the method of economics which also involves the relation between economics and ethics and which will lead directly into the problem of this paper. It relates to the ultimate data of economics, regarded as a pure science, dedicated to the search for truth and purified of all prejudices as to the goodness or badness of its principles and results. In this respect also economics has been far behind the natural sciences. Insufficient attention has been given to the separation between constants and variables; needless controversy and wasted effort have resulted from overlooking the fact that constants from one point of view may be variables from another, particularly that factors which are sensibly constant over short periods of time must be treated as variables when longer periods are under discussion.

Of the various sorts of data dealt with in economics no group is more fundamental or more universally and unquestioningly recognized as such than human wants. Yet one main purpose of the present discussion is to raise serious question as to the sense in which these wants can be treated as data, or whether even they are properly scientific data at all. We propose to suggest that these wants which are the common starting-point of economic reasoning are from a more critical point of view the most obstinately unknown of all the unknowns in the whole system of variables with which economic science deals. The answer to this question of whether and in what sense wants are data will be found to involve a clarification of the nature of economics as a science, of the nature of ethics, and of the relations between the two. If human wants are data in the ultimate sense for scientific purposes, it will appear that there is no place for ethical theory in the sense in which ethicists have conceived that subject, but that its place must be taken by economics. It will be interesting to observe that in view of a logically correct distinction between ethics and economics the great majority of economists not only, but in addition no small proportion of thinkers calling themselves ethicists, have not really believed in ethics in any other sense than that of a more or less " glorified " economics.

To state the fundamental issue briefly at the outset, are the motives with which economics has to do — which is to say human motives in general — "wants," "desires" of a character which can adequately be treated as *facts* in the scientific sense, or are they "values," or "oughts," of an essentially different character not amenable to scientific description or logical manipulation? For if it is the intrinsic nature of a thing to grow and change, it cannot serve as a scientific datum. A science must have a "static" subject-matter; it must talk about things which will "stay put"; otherwise its statements will not remain true after they are made and there will be no point to making them. Economics has always treated desires or motives as facts, of a character susceptible to statement in propositions, and sufficiently stable during the period of the activity which they prompt to be treated as causes of that activity in a scientific sense. It has thus viewed life as a process of satisfying desires. If this is true then life is a matter of economics; only if it is untrue, or a very inadequate view of the truth, only if the "creation of value" is distinctly more than the satisfaction of desire, is there room for ethics in a sense logically separable from economics.

In a more or less obscure and indirect way, the treatment of wants as data from which and with which to reason has already been challenged more than once. More or less conscious misgivings on this point underlie the early protests made by economists of the "historical" variety against the classical deductive economics, and the same is true in a more self-conscious way of the criticism brought by the modern "historismus," the "institutional economics" of Veblen, Hamilton, and J. M. Clark. Thus especially Clark,[1] whose position most resembles that herein taken, observes that the wants which impel economic activity and which it is directed toward satisfying are the products of the economic process itself: "In a single business establishment one department furnishes the desires which the other departments are to satisfy." Hitherto the chief emphasis has been placed on the factual instability of wants and their liability to be changed as well as satisfied by business activity. This is usually coupled with a deprecating attitude, a tendency to regard the growth of wants as unfortunate and the manufacture of new ones as an evil; what have not advertising and salesmanship to answer for at the hands of Veblen, for example! From the standpoint of hedonism, which is to say of the economic philosophy of life, this conclusion is undoubtedly correct. If the Good is Satisfaction, there are no qualitative differences, no "higher" and "lower" as between wants and that is better which is smaller and most easily appeased.

---

[1] "Economics and Modern Psychology," Journal of Political Economy, January and February, 1918. The quotation is from page 8.

It is not on any sentimental or idealistic ground, but as a plain question of the facts as to how the ordinary man conceives his own wants and interprets them in conduct that we shall argue against this view of the matter. Wants, it is suggested, not only *are* unstable, changeable in response to all sorts of influences, but it is their essential nature to change and grow; it is an inherent inner necessity in them. The chief thing which the common-sense individual actually wants is not satisfactions for the wants which he has, but more, and *better* wants. The things which he strives to get in the most immediate sense are far more what he thinks he ought to want than what his untutored preferences prompt. This feeling for what one *should* want, in contrast with actual desire, is stronger in the unthinking than in those sophisticated by education. It is the latter who argues himself into the "tolerant" (economic) attitude of *de gustibus non disputandum;* the man in the street is more likely to view the individual whose tastes are "wrong" as a scurvy fellow who ought to be despised if not beaten up or shot.

A sounder culture leads away from this view, to be sure, but it leads to a form of tolerance very different from the notion that one taste or judgment is as good as another, that the fact of preference is ultimately all there is to the question of wants. The consideration of wants by the person who is comparing them for the guidance of his conduct and hence, of course, for the scientific student thus inevitably gravitates into a *criticism of standards*, which seems to be a very different thing from the comparison of given magnitudes. The individual who is acting deliberately is not merely and perhaps not mainly trying to satisfy given desires; there is always really present and operative, tho in the background of consciousness, the idea of and *desire for a new* *want* to be striven for when the present objective is out of the way. Wants and the activity which they motivate constantly look forward to new and "higher," more evolved and enlightened wants and these function as ends and motives of action beyond the objective to which desire is momentarily directed. The "object" in the narrow sense of the present want is provisional; it is as much a means to a new want as end to the old one, and all intelligently conscious activity is directed forward, onward, upward, indefinitely. Life is not fundamentally a striving for ends, for satisfactions, but rather for bases for further striving; desire is more fundamental to conduct than is achievement, or perhaps better, the true achievement is the refinement and elevation of the plane of desire, the cultivation of taste. And let us reiterate that all this is true *to the person acting*, not simply to the outsider, philosophizing after the event.

In order to substantiate and support the doctrine thus sketched we turn to consider briefly the opposite view, which is that of the "economic interpretation." Historically this doctrine is associated with the so-called "scientific" socialism,[2] but we are here interested in it not in connection with any propaganda or policy, but simply as a theory of conduct, as one answer to the question of the relation between economics and ethics. Our first task is to find out what the doctrine really means.

The somewhat various statements of the theory reduce in general to the proposition that the course of history is "determined" by "economic" or "materialistic" considerations. All of these terms raise questions of interpretation, but the issue may be stated briefly. In the first place, the course of history is a matter of human behavior, and we shall as already indicated consider the problem in its broader aspect as a general theory of motivation. As to the word "determined," it is taken for granted that conduct is determined by motives; the statement is really a truism. The issue then relates to the fundamental character of motives; are they properly to be described as materialistic, or economic, in their nature? Between these two terms it is better to use "economic"; a "materialistic" motive would seem to be a contradiction in terms; a "motive" is meaningless unless thought of as a phenomenon of consciousness. The opposite view would merely throw us back upon a denial that conduct is determined by motives at all. Without attempting a philosophical discussion of this question we shall take the common-sense position.[3]

---

[2] It would be hard to imagine a more ill-mated team than fatalism as the credal basis for revolutionary propaganda, and a mechanistic philosophy of ruthless force and class war as the background for a moral transformation of the world!

Are human motives, then, ultimately or predominantly economic? If the expression, "economic motive" is to have any definite and intelligible meaning, it must be possible to distinguish between economic motives and other motives. The expression is, of course, widely used in learned and scientific discussion as well as in everyday speech, with the feeling that such a differentiation exists, but examination fails to show any definite basis for it or to disclose the possibility of any demarcation which is not arbitrary and unscientific. In a rough way, the contrast between economic and other wants corresponds to that between lower and higher or necessary and superfluous. The economic motives are supposed to be more "fundamental"; they arise out of necessities, or at least needs, or at the very least out of the more universal, stable, and materially grounded desires of men. The socialistic popularizers of the theory under discussion have leaned toward the narrower and more definite and logical conception of downright necessities.[4]

---

[3] In the writer's opinion a pure-science attitude in psychology leads inevitably to behaviorism, to a discussion of stimulation and response with consciousness out of it — i. e., away from "psychology." But it is false to the facts. Scientists must recognise that we cannot free any science, not even physics, to say nothing of psychology, entirely from subjective elements and formulate it in purely objective terms.

The view of the man in the street, as shown by students beginning the study of economics, and also common in text-book definitions of the science, is that the economic side of life is summed up in "making a living." But what is a living! If by a living we mean life as it is actually lived, everything is included, recreation, culture, and even religion; there is no basis for a distinction between the economic and anything else, and the term has no meaning. At the other extreme would be the idea of what is really necessary, the physiological requisites for the maintenance of life. Even this turns out on examination to be hopelessly ambiguous. Does "life" mean the life of the individual only, or that of the group or race? If the latter, does it include the increase of numbers, or only their maintenance at the existing level, or some other level? Does what is "necessary" refer to conditions under which life *will* be preserved or numbers maintained or increased, or only those under which it *could* be done? and under what assumptions as to the tastes and standards, and the scientific and technological equipment of the people? Even if we think of a population rigidly controlled as to their reproductive function (which is scarcely conceivable), the birth rate necessary to maintain numbers at a constant level would depend upon the death rate and hence would vary *widely* with the scale of living itself. We doubt whether the conception of necessity can even theoretically be defined in sufficiently objective terms to make it available for scientific purposes.

---

[4] Quotations could be multiplied, from socialists and others, to illustrate and prove the statement. Marx, indeed, is typically vague and metaphysical. Perhaps as clear a statement as any is that of Engels: "The determining consideration is always the production and reproduction of actual life." (From an article in the Sozialistische Akademiker, quoted in Ghent, Mass and Class, chap. I.)

Between these two extremes of what people actually get and what they rigorously require in order to live the only alternative is some conventional notion of what is "socially necessary," or of a "decent minimum." It is obvious that such a conception of a "living" is still more indefinite than the others, and the way seems to be closed to any objectively grounded differentiation between the making of a living and any other kind or portion of human activity.[5]

Another common-sense notion of the meaning of economic activity is that it includes everything which involves the making and spending of money or the creation and use of things having a money value. It will presently be argued that this is substantially correct for practical purposes as far as it goes tho it directly or indirectly covers virtually the whole life activity of a modern man and has to be limited to certain aspects of that activity. It is interesting to ask how much of our ordinary economic activity (economic in the sense indicated) is concerned with things which can reasonably be argued to be "useful" — not to say necessary — if by useful we mean that it contributes to health and efficiency, or even to happiness. If we begin with food, the most material and necessary of our requirements, it is obvious that but a fraction of a modest expenditure for board in an American town would come under this head.[6] And proceeding in order to our other "material" needs, clothing, shelter, furniture, etc., it is apparent that the farther we go the smaller the fraction becomes.

---

[5] The contrast between work and play may come to mind in this connection, but a little scrutiny will show that it affords no help from the difficulty. In a subsequent paper something will be said concerning the economic and ethical bearing of play.

[6] A considerably larger proportion may, of course, be "necessary" in the sense that under the actual conditions a person could not obtain and live upon the requisite quantities of protein and calories in the cheaper forms in which they might be had.

And it is not a large fraction of a fairly comfortable income which goes for all these items, if the purely ornamental, recreative, and social aspects are excluded.

Moreover, when we scrutinize the actual motives of actual conduct it is clear that the consciously felt wants of men are not directed toward nourishment, protection from the elements, etc., the physiological meaning of the things for which money is spent. They desire food, clothing, shelter, etc., *of the conventional kinds and amounts*. It is an ethnological commonplace that men of one social group will starve and freeze before they will adopt the ordinary diet and garb of other groups. Only under the direst necessity do we think in terms of ultimate physical needs as ends; the compulsion to face life on this level is equivalent to abject misery. A large proportion of civilized mankind would certainly commit suicide rather than accept life on such terms, the prospect for improvement being excluded. This interpretation of motives, which is the nearest approach to a definite meaning that can be given to the economic interpretation, is almost totally false. It is simply contrary to fact that men act in order to live. The opposite is much nearer the truth, that they live in order to act; they care to preserve their lives in the biological sense in order to achieve the *kind* of life they consider worth while. Some writer (not an economist or psychologist!) has observed that the love of life, so far from being the most powerful of human motives is perhaps the weakest; in any case it is difficult to name any other motive or sentiment for which men do not habitually throw away their lives.[7]

When we turn from the preservation of individual life to that of the race as a motive a similar situation is met with. Men will give up their lives for the group, but not for its *mere life*; it is for a better or at least a worthy life that such sacrifices are made. The life of the individual is logically prior to that of the group, as our physiological needs are logically prior to the higher ones, but again that is not the actual order of preference. Probably few civilized men would refuse to die for their fellows if it were clear that the sacrifice were necessary and that it would be effective.

---

[7] One of the most serious defects of economics as an interpretation of reality is the assumption that men produce in order to consume. Except for those very low in the economic scale the opposite is as near the truth, and the motives of a large part of even "lower-class" consumption are social in their nature.

But when materialistic interpreters speak of the perpetuity of the group as a motive they are likely to have in mind not this result in the abstract, but rather sex-feeling, the means by which continuity and increase are secured in the animal world. Here again they are squarely wrong; social existence and well-being in the abstract are more potent than sex attraction in any crude interpretation. With sex experience as with food, it is not the thing as such which dominates the civilized individual. His sex requirement is as different from that of animals as a banquet with all fashionable accompaniments is from the meal of a hungry carnivore which has made a kill, or a buzzard whose olfactory sense has guided him to a mellow piece of carrion. It is again a question of fact, and the fact patently is that when the biological form of the motive conflicts with the cultural, aesthetic or moral part of it — as more or less it about always does — it is the former which gives way. Sex debauchery is, of course, common enough, but this also rather obviously involves about as much cultural sophistication as does romantic or conjugal love, tho of a different kind.[8]

[8] It is of interest that the conduct which men denounce by calling it "bestial" (in the field of sex and elsewhere) is typically of a sort in which the "beasts" never indulge. Animals are not promiscuous on principle, but merely indifferent to the individual; they are rarely subject to the peculiar notion from which man is as rarely free, that one individual of the opposite sex is for sexual purposes different from others.

On every count this biological interpretation of human conduct falls down; no hunger and sex theory of human motives will stand examination. It will not be denied that human interests have evolved out of animal desires, and are ultimately continuous with them; and an understanding of animal behavior can throw light on human problems, but only if interpreted with the utmost caution. Man has risen clear above, or if this seems to beg any philosophical questions he has at least gotten clear away from the plane where life is the end of activity; he has in fact essentially reversed this relation. It is not life that he strives for, but the good life, or at the ultimate minimum a decent life, which is a conventional, cultural concept, and for this he will throw away life itself; he will have that or nothing. He has similar physical requirements with the animals, but has become so "particular" as to their mode of gratification that the form dominates the substance. A life in which bare existence is the end is *intolerable* to him. When his artificial, cultural values are in ultimate conflict with physical needs he rather typically chooses the latter, sacrificing quantity of life to quality, and it is hard to see how he could be prevented from doing so. We can scarcely imagine a slave society placed under physical compulsion so effective that men would permanently live in it. If they were given the least sight or knowledge of their masters and their masters' way of life, no provision however bountiful for all physical wants would prevent some irrational individual from setting up a cry for "liberty or death" and leading his willing fellows to the achievement of one or the other. It is a familiar historical fact that it is not the violently oppressed populations which rebel, but those whose milder bondage leaves them fairly prosperous.[9] The assumption of the materialistic, or economic, or biological interpretation of conduct is that when men must choose between some "real need" and a sentimental consideration they will take the former. The truth is that when the issue is drawn they typically do the reverse. For any practical social purpose, beauty, play, conventionality and the gratification of all sorts of "vanities" are more "necessary" than food and shelter.[1]

---

[9] We have omitted mention of the class struggle historically associated with the economic interpretation. It may be remarked in passing that the effective motive of

Some attention must now be given to another method of interpreting conduct, closely related to the biological and like it aimed at supplying an objective measure of well-being. This is the theory that man has inherited certain *instincts* which must achieve a substantial measure of successful expression in action or the individual will develop maladjustment, balked disposition and unhappiness. We cannot go at length into the failure of this theory either to explain actual behavior or to yield

---

insurrection, and especially of its upper-class leadership is essentially idealistic. Revolutions would rarely if ever succeed without the belief that the cause is *right* in the minds of *both parties* to the struggle. The pet notion of Labriola, that people make up sentimental reasons for their acts when their real motives are materialistic will also gain more in truth than it will lose by being inverted. Back of the much exploited economic motive in international antagonisms also, conventional and sentimental considerations are clearly to be seen. What men fight over in war is the conflict between cultures, devotion to which is proverbially unconnected with any objective superiority.

[1] This thesis cannot be elaborated and emphasized as it deserves to be. Some reference ought to be made to the most notorious advocate of the opposite view among social philosophers, Herbert Spencer. His work is a development of the principle that all human values are to be gauged by the standard of tending to the "increase of life," which principle he views as axiomatic from the angles of right as well as necessity. Our contention is that actually the increase of life is rather a by-product of activity, in a sense a necessary evil.

It is interesting to note that "quantity of life" cannot be given an objective meaning as a measurable quantity, to say nothing of its ethical character. Life is a highly heterogeneous complex whose elements resist reduction to any common denominator in physical terms. How compare the quantity of life represented by a hog with that in a human being? They are different *kinds* of things. To common sense, a handful of fleas would seem to contain more "life" than a town meeting or the Royal Society, but Mr. Spencer would hardly contend that it represents more "value." The only purely physical measurement of life that is readily conceivable would be a determination of the quantity of energy in ergs involved in metabolic change in a unit of time.

A confusion essentially the same as that of Spencer seems to underlie the contrast between industrial and pecuniary values developed by Veblen and Davenport. There is no mechanical measure of values which will bear examination, and we cannot compare values or kinds of value without having something to say about value-standards for reducing to common terms magnitudes infinitely various in kind.

ideal requirements, and fortunately it is unnecessary to do so as the doctrine is now properly passing out of favor.[2] The significance to be claimed for the theory is that of supplementing the biological interpretation. Certain acts not now useful in the biological sense are assumed to have been so in the past under different conditions, and the organism has become so adjusted to them that its normal functioning depends upon their continued performance.

If instincts are to be scientifically useful, it must surely be possible to get some idea of their number and identity. But there has always been substantially unanimous disagreement on this point. Logically the choice seems to lie between a meaningless single instinct to do things-in-general and the equally meaningless hypothesis of a separate instinct for every possible act. Between these two views is a free field for arbitrary classification. Such fairly concrete lists as have been given consist chiefly of enumerations of the possible alternatives of action in possible types of conduct situations, and largely reduce to pairs of opposites. For a single illustration, an animal in danger may fight or run. Hence our theorists come forward with an "instinct" for each of these types of reaction. This of course tells us nothing of what we want to know which is, *which one* of the possible reactions will take place. It is not enlightening to be told that conduct consists in choosing between possible alternatives.

A mere classification of feelings or cravings has some interest, however void of scientific utility it may be, but the psychologist can hardly claim to have "discovered" the emotions. In this connection it is interesting to consider the extent to which motives do fall into pairs of opposites. There are numerous such couples or polarizations which cut deeper into human nature than do the proposed instincts. Our reasons for wanting things come down in astonishingly large measure to the desire to be like other people, and the desire to be different; we wish to do things because we can, or because we cannot; we crave companionship, of the right kind, but the requirement of privacy, even solitude, is equally imperative; we like the familiar, also the novel, security but likewise adventure, and so on. Acquisitiveness, the instinct which should be most salable to the economist is perhaps but the opposite of our alleged gregariousness, one being essentially the desire to exclude others from certain interests and the other the desire to share them. All these, like selfishness and unselfishness, have some meaning, but are hardly suitable bases for a scientific classification. It is significant that McDougall, the father of the modern instinct theory, regarded the feeling element as the only stable part of the instinct, both stimulus and reaction being subject to indefinite shift and change. The unsuitability of such a view as a foundation for the superstructure built upon it in the way of scientific laws of *behavior* hardly calls for comment.[3]

---

[2] Cf. Ellsworth Faris, "Are Instincts Data or Hypotheses," American Journal of Sociology, September, 1921.

Also C. E. Ayres, "Instinct and Capacity," Journal of Philosophy, October 13 and 27, 1921.

---

[3] The logical defect of the instinct theory is a misconception of the aims and methods of scientific procedure, which fallacy also pervades the attempt to make psychology scientific. The significance of instincts would lie in the application of the analytic method to the study of consciousness (here, on its conative or volitional side). Analysis in natural science means different things in different cases, the general basis of its employment being that a thing can be explained by showing what it is made of. In some cases we can predict the whole from the parts by simple addition, in others by vector addition, as of forces in mechanics. In other cases we can only predict empirically as in chemistry. The properties of the compound (except mass) bear no simple or general relation to those of the elements, but we do know by experiment that the same compound can always be obtained from the same elements by putting them together in the same way (and conversely). The case of colors is interesting. One spectral color is physically as primary as another, yet a *few* are primary *in the sense that* we can get the others by mixing them. *None of these assumptions hold* in the study of consciousness, and analysis must be given a very special meaning in this field if it is to have any meaning at all. In our opinion Professor Bode has put an eternal quietus on much of what passes for science in psychology. See his paper on "The Doctrine of Focus and Fringe," Philosophical Review, 1914.

From the instinct theory we turn naturally to the ancient doctrine of psychology and ethics to which it is a handmaiden, that the end of activity is a "harmonious adjustment" of the organism, a smooth and unobstructed functioning of the digestive, neuro-muscular and glandular systems (and perhaps the reproductive also, and any special structures concerned with tending the young or other social activities) and for consciousness the feeling of satisfaction or comfort that goes with this condition.[4] Freudianism and abnormal psychology have seemed to confirm this view, and Thorndyke [5] also tho rather guardedly speaks of behavior as controlled by "satisfiers" and "annoyers." Perhaps a sufficient comment on the hedonistic theory would be to run through again the main categories of economic wants, food, clothing, shelter, amusement, etc., and simply ask the candid question as to what fraction of the ordinary man's expenditure for any of them makes him "feel better" or is expected to do so. The higher one is in the economic scale, the more successful in doing what all are trying to do, the larger is the proportion of his consumption which tends to make him less, and not more, "comfortable."

The authors of great imaginative literature — always indefinitely better psychologists than the psychologists so-called — have never fallen into any such palpable delusion as the belief that men either strive for happiness or expect to be made happy by their striving. The same has been true of philosophers and religious thinkers of all time, and even economists have recognized the futility of attempting to satisfy wants. It is obvious that wants multiply in at least as great a ratio as the heads of the famous hydra. Greeks as well as Hindus, and Epicureans as well as Stoics and Cynics perceived at the dawn of modern culture that it is indefinitely more "satisfactory" and "economical" to repress desire than to attempt to satisfy it. Nor do men who know what they do want — and who have not sapped their vitality by unnatural living or too much of a certain kind of thinking — want their wants satisfied. This argument of economists and other pragmatists that men work and think to get themselves out of trouble is at least half an inversion of the facts. The things we work for are "annoyers" as often as "satisfiers"; we spend as much ingenuity in getting into trouble as in getting out, and in any case enough to keep in effectively. It is our nature to "travel afar to seek disquietude," and "'tis distance lends enchantment to the view." It cannot be maintained that civilization itself makes men "happier" than they are in savagery. The purpose of education is certainly not to make anyone happy; its aim is rather to raise problems rather than solve them; the association of sadness and wisdom is proverbial, and the most famous of wise men observed that "in much wisdom is much grief, and he that increaseth knowledge increaseth sorrow." Thus the pursuit of the "higher things" and the crasser indulgences are alike failures if the test is happiness.

---

[4] The socialists have assumed hedonism rather than argued for it. Spencer regarded it as also axiomatic that life-sustaining activities are necessarily pleasure-giving (Data of Ethics, Sec. 34) and vice versa. Modern pragmatism seems to run in terms of the same twofold assumption that The Good is identical with both the biologically beneficial and the actually desired. It seems to us that critical thought confirms common sense in repudiating both parts of this dogma.

[5] The Original Nature of Man. New York, 1913.

But the test is not happiness. And by this we do not mean that it ought not to be but the simple fact that that is not what men want. It is a stock and conclusive objection to utopias that men simply will not live in a world where everything runs smoothly and life is free from care. We all recall William James' relief at getting away from Chatauqua. A man who has nothing to worry about immediately busies himself in creating something, gets into some absorbing game, falls in love, prepares to conquer some enemy or hunt lions or the North Pole or what not. We recall also the case of Faust, that the Devil himself could not invent escapades and adventures fast enough to give his soul one moment's peace. So he died, seeking and striving, and the Angel pronounced him thereby "saved": — "Wer immer strebend sich bemüht, den können wir erlösen." The pleasure philosophy is a false theory of life; there abide pain, grief and boredom: these three; and the greatest of these is boredom. The Hindus thought this question of happiness through to the end long ago, and reached the inevitable conclusion — Nirvana — just life enough to enjoy being dead.[6]

---

[6] There is an incident in the Life of Pyrrhus, as told by Plutarch, which shows the nature of man and his motives so much better than all the scientific psychology ever written that it merits repeating substantially as that author tells it.

"When Pyrrhus had thus retired into Epirus, and left Macedonia, he had a fair occasion given him by fortune to enjoy himself in quiet, and to govern his own kingdom in peace. But he was persuaded, that neither to annoy others, nor to be annoyed by them, was a life insufferably languishing and tedious. . . . His anxiety for fresh employment was relieved as follows. (Then follows a statement of his preparations for making war against Rome.)

"There was then at the court of Pyrrhus, a Thessalonian named Cineas, a man of sound sense, and . . . who had devoted himself to Pyrrhus in all the embassies he was employed in . . . and he continued to heap honors and employments upon him. Cienas, now seeing Pyrrhus intent upon his preparations for Italy, took an opportunity, when he saw him at leisure, to draw him into the following conversation: — 'The Romans have the reputation of being excellent soldiers, and have the command of many warlike nations: if it please heaven that we conquer them, what use, Sir, shall we make of our victory?' 'Cineas,' replied the king 'your question answers itself. When the Romans are once subdued, there is no town, whether Greek or barbarian, in all the country, that will dare oppose us; but we shall immediately be masters of all Italy, whose greatness, power and importance no man knows better than you.' Cineas, after a short pause, continued. 'But, after we have conquered Italy, what shall we do next, Sir?' Pyrrhus, not yet perceiving his drift, replied, 'There is Sicily very near, and stretches out her arms to receive us, a fruitful and populous island, and easy to be taken. . . .' 'What you say, my prince,' said Cineas, 'is very probable; but is the taking of Sicily to conclude our expeditions?' 'Far from it,' answered Pyrrhus,' 'for if heaven grant us success in this, that success shall only be the prelude to greater things. Who can forbear Libya and Carthage, then within reach? . . . And when we have made such conquests, who can pretend to say that any of our enemies, who are now so insolent, will think of resisting us?' To be sure,' said Cineas, 'they will not; . . . But when we have conquered all, what are we to do then?' 'Why, then, my friend,' said Pyrrhus, laughing, we will take our ease, and drink, and be merry.' Cineas, having

The idea of a distinction between economic wants and other wants must be abandoned. There is no definable objective, whether subsistence, gratification of fundamental impulses or pleasure, which will serve to separate any of our activities from the body of conduct as a whole. Nor, we aim especially to emphasize, is there any *definable* objective which properly characterizes any of it. It simply is not finally directed to the satisfaction of any desires or the achievement of any ends external or internal[7] which can be formulated in propositions and made the subject of logical discourse. All ends and motives are economic in that they require the use of objective resources in their realization; all are ideal, conventional or sentimental in that the attempt to define objective ends breaks down. Behind them all is "the restless spirit of man," who is an aspiring rather than a desiring being; and such a scientifically undescriptive and unsatisfactory characterization is the best we can give.[8]

For the purpose of defining economics the correct procedure would appear to be to start from the ordinary meaning of the verb to economize, that is, to use resources wisely in the achievment of *given* ends. In so far as the ends are viewed as given, as data, then all activity

---

brought him thus far replied, 'And what hinders us from drinking and taking our ease now, when we have already those things in our hands, at which we propose to arrive through seas of blood, through infinite toils and dangers, through innumerable calamities, which we must both cause and suffer?'

"This discourse of Cineas gave Pyrrhus pain, but produced no reformation. . . ."

[7] The term happiness is as heterogeneous as any other; its only meaning is that the end of action is *some* state of consciousness. Besides being as vague as possible this statement, in the view of practically all thinkers on ethics who were not hoodwinked by economic logic and the price system itself, is false.

[8] This reasoning refutes alike such classifications of wants as Professor Everett has given in his very charming book on Moral Values (chap. VII, esp. sec. II) and the distinction between industrial and pecuniary values already mentioned. All of Everett's kinds of value are economic; in fact nearly any specific value belongs to most of his classes.

In regard to "real ends," we should note the futile quest of a Summum Bonum by ethical thinkers.

is economic. The question of the effectiveness of the adaptation of means is the only question to be asked regarding conduct, and economics is the one and all-inclusive science of conduct.[9] From this point of view the problem of life becomes simply the economic problem, how to employ the existing and available supplies of all sorts of resources, human and material, natural and artificial, in producing the maximum *amount* of *want-satisfaction*, including the provision of new resources for increased value production in so far as the present population finds itself actually desiring future progress. The assumption that wants or ends are data reduces life to economics,[1] and raises again the question with which we started out, Is life all economics or does this view require supplementing by an ethical view of value?

The conception of economics outlined above is in harmony with the traditions of economic literature. The "economic man," the familiar subject of theoretical discussion, has been much mistreated by both friends and foes, but such a conception, explicit or implicit, underlies all economic speculation. The economic man is the individual who obeys economic laws, which is merely to say that he obeys *some* laws of conduct, it being the task of the science to find out what the laws are. He is the *rational* man, the man who knows what he wants and orders his conduct intelligently with a view to getting it. In no other sense can there be laws of conduct or a science of conduct; the only possible "science" of conduct is that which treats of the behavior of the economic man, i. e., economics in the very broad sense in which we have used the term. A scientific principle necessarily takes the form that under given conditions certain things can be counted upon to happen; in the field of conduct the given conditions are the desires or ends and the rationale or technique for achieving them.

---

[9] For purposes of academic division of labor this will have to be restricted by excluding the technological aspect of adaptation and restricting economics to the general theory of organization. Most of the attention will practically be given to the theory of the *existing* organization, through private property and competitive free exchange, which makes economics virtually the science of prices. Our definition of the economic aspect of behavior includes not only technology as ordinarily understood but the techniques of all the arts.

[1] That is, on the practical or conduct side. A word may be in place as to the relation between economics as a science thus broadly conceived and related sciences. Conduct is not co-extensive with human behavior; much of the latter is admittedly capricious, irrational, practically automatic, in its nature. Different actions have in various degrees the character of conduct, which we define with Spencer as "the adaptation of acts to ends," or briefly, deliberative or rational activity. Much that is at the moment virtually reflex and unconscious is, however, the result of habit or of self-legislation in the past, and hence ultimately rational. But there is a place for the study of automatic responses, or behaviorism, and also for psychology, which should not be confused with the former.

We have by no means meant to repudiate the attempt of biology to explain the end or motives which the science of conduct uses as data. This is altogether commendable, as is also the effort to explain biology in physico-chemical terms. These researches should be pushed as far as possible; we object only to the uncritical assumption that they have explained something when they have not, and to dogmatic assertion (either way) as to how far it is intrinsically possible to carry such explanations.

The objections raised to the notion of the economic man, are however also sound in their own way. They reduce to the proposition that *there is no such man*, and this is literally true. Human beings do not in their conscious behavior act according to laws, and in the concrete sense a science of conduct is an impossibility. They neither know what they want — to say nothing of what is "good" for them — nor act very intelligently to secure the things which they have decided to try to get.[2] The limitation on intelligence — knowledge of technique — is not fatal to the conception of a scientific treatment of behavior, since people are "more or less" intelligent, and "tend" to act intelligently, and all science involves a large measure of abstraction. Far more essentially is the limitation due to the fact that the "given conditions," the causes at work, are not really given, that wants are not ultimately data and the individual more or less completely recognizes that they are not.

---

[2] From this point of view again the animals are superior to man, in that they are more intelligent, sensible; a hog knows what is good for him and does it!

The definition of economics must, therefore, be revised to state that it treats of conduct *in so far* as conduct is amenable to scientific treatment, in so far as it is controlled by definable conditions and can be reduced to law. But this, measured by the standard of natural science, is not very far. *There are no data* for a science of conduct in a sense analogous to natural science. The data of conduct are provisional, shifting, and special to individual, unique situations in so high a degree that generalization is relatively fruitless. *For the time being*, an individual acts (more or less) *as if* his conduct were directed to the realization of some end more or less ascertainable, but at best provisional and vague. The person himself is usually aware that it is not really final, not really an "end"; it is only the end of the particular act, and not the ultimate end of that. A man engaged in a game of chess acts *as if* the supreme value in life were to capture his opponent's pieces; but this is obviously not a true or final end; the circumstances which have led the individual to accept it as end for the moment come largely under the head of accident and cannot be reduced to law — and the typical conduct situation in civilized life is analogous to the game in all the essential respects.

A science of conduct is, therefore, possible only if its subject-matter is made abstract to the point of telling us little or nothing about actual behavior. Economics deals with the form of conduct rather than its substance or content. We can say that a man will in general prefer a larger quantity of wealth to a smaller (the principal trait of the economic man) because in the statement the term "wealth" has no definite concrete meaning; it is merely an abstract term covering everything which men do actually (provisionally) want. The only other important economic law of conduct, the law of diminishing utility, is almost as abstract; its objective content is covered by the statement that men strive to distribute income in some way most satisfactory to the person at the time among an indefinite number of wants and means of satisfaction rather than to concentrate upon one or a few. Such laws are unimportant because they deal with form only and say virtually nothing about content, but it is imperative to understand what they do and what they do not mean.

If one wishes to study the concrete content of motives and conduct he must turn from economic theory to biology, social psychology and especially culture history. Culture history is not, therefore, a method of economics, as the historic quarrel would lead one to think, but a different field of inquiry. It gives a *genetic*, and not a *scientific* account of its subject-matter. History has, indeed, tried to become a science and the effort has brought forth numerous "philosophies of history," but it is open to grave doubt whether "laws" of history exist and whether the entire project is not based on a misconception.[3]

If a science of economics is limited to the abstract form of conduct and the treatment of conduct in the concrete takes the form of history rather than science, what is to be said of ethics? In addition to the explanation of conduct in terms of motives and the explanation of the motives, common sense does raise another kind of question, that of the *evaluation* of motives. But we are met at the outset with the logically insuperable difficulty that the criticism of an end implies some *standard*, which can logically only be another end, which to enter into logical discourse must be viewed as a datum, like the first. Hence, scientifically, we can never get beyond the question of whether one end conflicts with another and if so which is to be sacrificed. But this mere comparison of ends as given magnitudes belongs to the economic calculation involved in creating the maximum amount of value or want-satisfaction out of a given fund of resources; hence there seems to be no place for anything but economics in the field of value, and scientifically there is none. If we are to establish a place for ethics really distinct from economics and independent of it, it must be done by finding ends or standards which are something more than scientific data.[4]

---

[3] It is impossible to discuss at length the relations between historic (genetic) and scientific explanation. The distinction is perhaps sufficiently well established to justify using the terms without a lengthy philosophic analysis. Our point of view is not that either of these is "higher" than the other; we merely insist that they are different and that each can fulfill its special purpose best by recognizing the difference.

For those to whom ethics is only a more or less "glorified" economics, virtue is correspondingly reduced to an enlarged prudence. But the essential element in the moral common sense of mankind seems to be the conviction that there is a difference between virtue and prudence, between what one "really wants" to do and what one "ought" to do; even if some religious or other "sanction" makes it ultimately prudent to do right, at least it remains true that it is prudent because right and not right because prudent or because there is no difference between the two. A considerable part of the literature of ethics consists of debate over the validity of this distinction and of moral common sense, which is to say over whether there is any such thing as ethics or not, and the question creates perhaps the most fundamental

[4] It was remarked early in the present discussion that one leading school of ethicists (the hedonistic) merely enlarge the principles of economics and do not believe in any other ethics. Economists have usually held to this view — the principle is the same whether their good is called pleasure or want-satisfaction, so long as it is held to be quantitative — and now the same position is being taken up by the realistic school of philosophers who regard value as a real quality in things. Cf. R. B. Perry, The Moral Economy.

division between schools of thought. There was no difficulty for the Greeks, who had no word for duty or conscience in their language, and there is none for the modern "pagan" who considers these things as outworn puritan superstitions. It must appear dogmatic to seem to take sides on the question without working out an entire philosophic system in justification of the position, but we wish to point out that *if* there is to be a real ethics it cannot be a science, and to cite a few reasons for believing in the possibility of a real ethics.

The first of these considerations is the argument developed in this paper that the view of ends as scientific data breaks down under examination. The second is that the rational, economic, criticism of values gives results repugnant to all common sense. In this view the ideal man would be the economic man, the man who knows what he wants and "goes after it" with singleness of purpose. The fact is, of course, the reverse. The economic man is the selfish, ruthless object of moral condemnation. Moreover we do not bestow praise and affection on the basis of conduct alone or mainly, but quite irrationally on the motives themselves, the feelings to which we impute the conduct.

We cannot dwell on the moral habitability of the world under different hypotheses or argue the question whether such implications constitute "evidence" for the hypothesis in question. The disillusioned advocate of hard-headedness and clear thinking would usually admit that the "moral illusion" has stood the pragmatic test and concede its utility while contending that it is scientifically a hoax. But it is pertinent to observe that the brick-and-mortar world cannot be constructed for thought out of purely objective data. There is always a feeling element in any belief. Force and energy are notoriously feelings of ours which we read into things, yet we cannot think of anything as real without force as a real. Apparently we are incapable of picturing anything as existing without putting a spark of our own consciousness into it. Behind every fact is a theory and behind that an interest. There is no purely objective reason for believing anything any more than there is for doing anything, and if our feelings tell us nothing about reality then we know and can know nothing about it. From this it is an easy step to see that the intolerable repugnance of the idea that not only duty and right, but all effort, aspiration and sacrifice are delusions is after all as good a reason for believing that they are not as we have for believing that the solid earth exists in any other sense then seeming to us to do so.

But the main argument for the validity and necessity of a real, non-scientific, transcendental ethics comes out of the limitations of scientific explanation. We have seen that the "scientific" treatment of conduct is restricted to its abstract form, that its concrete content can only be explained "historically." But in dealing with human problems we are constantly thrown back upon categories still more remote from the scientific, upon relations which cannot be formulated in logical propositions at all, and we must admit that a large part of our "knowledge" is of this character. That figurative language does convey a meaning, however, is indisputable, and it is commonly a meaning which could not be expressed literally. When Burns says that his Love is "like a red, red rose," etc., when Kipling tells us of Fuzzy-Wuzzy that "'E's a daisy, 'e's a ducky, 'e's a lamb," their words meaning something, tho it is not what they say! William James has commented on the effectiveness of these comparisons whose physical basis is undiscoverable, illustrating by the statement that a certain author's style is like the atmosphere of a room in which pastilles have been burning. Let anyone take even a science text-book and try to translate all the figurative expressions into literal, purely logical form, and he will realize how impossible it is to describe the world in terms which mean definitely what they say.

Of this general description must be the criticism of values, as it is the character of æsthetic and literary criticism. Our values, our standards, are only more obviously of the same character which our desires reveal on examination — not describable because not stable, growing and changing by necessity of their inner nature. This is, of course, intellectually unsatisfactory. The scientific mind can rest only in one of two extreme positions, that there are absolute values, or that every individual desire is an absolute and one as "good" as another. But neither of these is true; we must learn to think in terms of "value-standards" which have validity of a more subtle kind. It is the higher goal of conduct to test and try these values, to define and improve them, rather than to accept and "satisfy" them. There are no rules for judging values, and it is the worst of errors to attempt to make rules — beyond the rule to "use good judgment"; but it is also most false to assert that one opinion is as good as another, that *de gustibus non disputandum est.* Professor Tufts has put the question in a neatly epigrammatic way which emphasizes its unsatisfactoriness from a rational, scientific standpoint: "The only test for goodness is that good persons on reflection approve and choose it—just as the test for good persons is that they choose and do the good." [5]

---

[5] See essay on "The Moral Life," in the volume entitled Creative Intelligence, by Dewey and others. Professor R. B. Perry in a review as beautifully illustrates the inevitable scientific-economic reaction to this viewpoint. See Quarterly Journal of Ethics, vol. 28, p. 119, where Professor Perry, referring to the statement quoted above, says: ". . . it cannot appear to its author as it appears to me. I can only record my blank amazement."

If the suggestions above thrown out are sound, there is room in the field of conduct for three different kinds of treatment: first, a scientific view, or economics and technology; second, a genetic view, or culture history, and third, for a Criticism of Values. The discussion of the latter will, like literary and artistic criticism, run in terms of suggestion rather than logical statement, in figurative rather than literal language, and its principles will be available through sympathetic interpretation rather than intellectual cognition.[6]

FRANK H. KNIGHT.

UNIVERSITY OF IOWA.

---

[6] There is obviously a need for a better terminology, if history and criticism are to have their methods properly named and if they are to be adequately distinguished from the "sciences." Such adjectives as genetic and normative, used with the word science are objectionable, but perhaps the best we can do. They do not sufficiently emphasize the contrasts.

It should be noted that some writers have attempted to make ethics scientific on the basis of somewhat different logical procedure from that sketched above. They regard the end of conduct as the production of some "state of consciousness" (pleasure or happiness) but assume that the common sense being does not know the effects of acts and hence that special study of past experience (on the basis of the *post facto* satisfactoriness of results) is necessary to secure rules for guidance. This reasoning does not separate ethics from economics, however, as it is again a mere question of technique for securing recognized ends.

GERMAN FOREIGN TRADE AND THE REPARATION PAYMENTS

SUMMARY

I. Germany's economic paradox, 482. — The pre-war trade balance, 483. — Why the London Settlement on reparations broke down, 483. — The two periods of falling exchange since the Armistice, and the different behavior of the foreign trade, 485. — II. The reasons for the paradox: composition of the exports and the imports, 487. — Effect upon imports of the abolition of food price control, 489. — Relation of United States exports to German imports last year, 489. — The system of export control, 490. — Effects of depreciating exchange on home buying, 492. — The export trade has responded more sympathetically to a moderate rise of the mark, 493. — A growth of exports sufficient to pay reparations depends largely upon recovery of the Russian market, 493. — How the imports have been paid for and the reparation charges met, 495. — III. Germany's experiences furnish light on the theory of foreign exchange under paper, 498. — Export and domestic prices compared, 499. — The causal sequence appears to have run as follows: reparation payments, depreciating exchange, rising export and import prices, rising internal prices, budgetary deficits and increased private demand for credit, increased note issue, 501.

I

GERMAN foreign trade in 1921 displayed a striking economic paradox. It is now a commonplace that Germany's ability to pay reparations[1] depends on the capacity of the export trade to expand over imports. The short-lived attempt to meet the payments required by the London agreement of May 5, 1921 was undoubtedly the chief cause [2] of the precipitous decline of the mark between May and November. According to theory, the depreciating foreign exchange value of the mark should have stimulated exports and depressed imports. Much of the agitation in this country for higher duties and the American valuation plan has been aimed particularly against the expected flood of cheap goods from Germany; and similar legislation has been passed or is contemplated in Sweden, Denmark, Norway, Great Britain, Switzerland, Finland, Argentina, and Japan. The German trade statistics, however, show that instead of the expected increase of exports, the fall of the mark last year was accompanied by an increasing excess of imports over exports.

---

[1] Since our concern in this paper is not with the reparation problem as a whole, but only with its foreign trade aspect, it is unnecessary to consider the distinction between ability to pay and ability to transfer the payment. The latter is a question of foreign trade; the former is primarily a question of national resources and income, when viewed from the standpoint of the German people, and primarily a question of the budget, when viewed from the standpoint of their government. That these and the foreign trade are but different aspects of the same problem, and closely interrelated, is of course obvious. The foreign trade as here discussed, omits reparations in kind, which have no direct connection with the exchange and price conditions we are concerned with.

To appreciate what occurred last year one must recall Germany's pre-war trade balance. In 1913 exports amounted to about 10,000,000,000 gold marks and imports to about 11,125,000,000 gold marks; and for the five years ending with 1913 the average excess of imports was $370,000,000 a year, the difference representing the surplus of income from foreign investments over new investment, shipping earnings, tourists' expenditures, and the like. Since the war removed most of these credits, and the shipping balance, despite signs of remarkable recovery since the Armistice, must now stand as a debit, it is evident that with a foreign trade of pre-war magnitude Germany would now need, quite apart from the reparation payments, to expand exports or reduce imports by several hundred million dollars a year. The reorganization of national production and consumption implied would raise for Germany, even were reparations canceled, as difficult a problem in foreign trade as that now facing any other nation.

To this is added the reparation charge. To pay the sum named in the Versailles Treaty, 138,000,000,000 gold marks,[3] would require at 5 per cent interest and 1 per cent sinking fund annual payments of 8,280,000,000 gold marks. As Keynes has pointed out,[4] to pay this bill under the plan provided by the London Settlement of last May, which called for 2,000,000,000 gold marks a year plus 26 per cent of the exports, German exports would have had to rise to 24,000,000,000 gold marks a year, or about two and a half times the pre-war export trade, and this without any increase of imports beyond their pre-war level. In the last eight months of 1921[5] German exports actually amounted to 2,432,000,000 gold marks, or at the rate of 3,650,000,000 gold marks a year, about one-third of the pre-war figure. With exports of this magnitude, the actual reparation bill from May through December, 1921, amounted under the London Settlement plan to 1,965,000,000 gold marks.[6] In other words, in order to meet even the relatively moderate terms of the London Settlement, Germany's exports in those eight months would have needed to exceed her imports by almost 2,000,000,000 gold marks. But, in fact, the imports exceeded the exports by 557,000,000 gold marks. For months, therefore, before the German government announced in December[7] that it could not meet the January and February payments of this year, the complete breakdown of the plan announced to the world last May as a final solution of the reparations problem was seen to be inevitable.

---

[2] See below, pp. 501–3.

---

[3] Including the Belgian war debt.

[4] "A Revision of the Treaty," p. 71.

[5] Trade statistics for the first four months have not been published.

[6] According to the schedule of payments in force, the actual payments made during this period were 1,051,000,000 gold marks. Including deliveries in kind, transfers of property, etc. (5,246,000 gold marks), the total payments in 1921 were 6,424,000,000 gold marks. Federal Reserve Bulletin, March, 1922, p. 301.

[7] Since that time ten-day payments of 31,000,000 gold marks have been made. These represent, apparently, merely the sums due under the 26 per cent levy on exports, no attempt being made to collect any portion of the 2,000,000,000 gold marks annual cash payment required under the London Settlement. Under a new arrangement, announced tentatively by the Reparations Commission at the end of February, the payments to be required this year are to consist of 720,000,000 gold marks in cash and 1,450,000,000 gold marks in kind.

The contradictory behavior of German foreign trade last year [8] is seen most strikingly by a comparison of the two boom periods which Germany has experienced since the Armistice as a result of the depreciating mark exchange. The first occurred in the fall and winter of 1919–20, and the second in the period May–November, 1921. In the earlier period the mark fell from 7.13 cents in July, 1919 to 1.08 cents in February, 1920. As will be seen from the table, the result was a pronounced increase in both imports and exports, in terms of paper marks. But on a gold basis imports declined from 1,061,000,000 gold marks in July, 1919 to 269,000,000 gold marks in February, 1920, while exports considerably increased. This is best shown by the monthly trade balance. From an excess of imports of 890,000,000 gold marks in July, 1919 the unfavorable balance was reduced to 76,000,000 gold marks in February, 1920. In the first period of depreciating mark exchange, therefore, the behavior of the foreign trade bore out theoretical expectation. Exports were stimulated and imports discouraged.

---

[8] Complete trade statistics for the period since the Armistice have not yet been published. For 1919 and the first five months of 1920 trade data, in paper marks, were presented by the German delegates to the Brussels Financial Conference. For 1920 complete statistics by weight are available, but only for exports are the values given.* For January–April, 1921 no figures at all have appeared, but since that time we have had complete statistics by value and by quantity for both imports and exports. Incomplete as the data are, they are yet sufficient to give the main outlines of the situation. In quantity, imports have fallen from a monthly average of 6,058,000 metric tons in 1913 to 1,570,000 in 1920 and 2,157,000 in 1921. Germany's imports in 1920 were thus about one-fourth of the quantity imported in 1913, and in 1921 were about one-third the pre-war figure. In exports the monthly average was 6,146,000 tons in 1913, 1,650,000 tons in 1920, and 1,610,000 tons in 1921. The exports have thus been about one-fourth of the pre-war figure, so far as quantities are concerned. It will be seen, too, that while imports increased about one-fourth in quantity last year over 1920, the quantity exported actually declined. The value figures are even more striking. From monthly average imports of 927,000,000 gold marks in 1913 imports fell to 571,000,000 gold marks a month in 1919–20 and 375,000,000 gold marks in 1921. Exports meanwhile declined from 841,000,000 gold marks per month in 1913 to 256,000,000 gold marks a month in 1919–20 and 304,000,000 gold marks in 1921. In other words, German exports and imports last year were little more than one-third of the pre-war figures.

* Since this note was written value statistics for imports in 1920 have been published.

GERMAN FOREIGN TRADE

	1,000,000 paper marks			1,000,000 gold marks [9]		
	Imports	Exports	Balance	Imports	Exports	Balance
1913 Monthly average	....	....	....	927	871	−56
JULY, 1919 TO MAY, 1920						
1919						
July	3538	570	−2968	1061	171	−890
August	3817	735	−3082	824	158	−666
September	4191	790	−3401	702	132	−570
October	5179	1089	−4090	832	175	−657
November	4446	1284	−3162	500	144	−356
December	5178	4014	−1164	489	392	− 97
1920						
January	6560	3219	−3341	459	224	−235
February	5932	4262	−1670	269	193	− 76
March	5683	4216	−1467	310	230	− 80
April	4768	5344	+ 576	328	379	+ 51
May	5537	6647	+1110	514	616	+102
Totals	54829	32170	−22659	6288	2814	−3474
Monthly average	4984	2924	−2059	571	256	−315
MAY TO DECEMBER, 1921						
1921						
May	5486	4558	− 928	373	310	− 63
June	6409	5432	− 977	392	331	− 61
July	7580	6208	−1372	407	334	− 73
August	9418	6683	−2735	463	328	−135
September	10668	7519	−3149	440	309	−131
October	13900	9700	−4200	396	276	−120
November	11912	12278	+ 366	219	226	+ 7
December	13707	14554	+ 847	299	318	+ 19
Totals	79080	66932	−12148	2989	2432	−557
Monthly average	9885	8366	−1518	373	304	− 69

---

9. Gold marks obtained by multiplying paper mark figure for each month by percentage of parity for that month of German mark in terms of American dollar.

In marked contrast has been Germany's experience with foreign trade during the second period of pronounced exchange depreciation, May–November, 1921. The mark fell from 1.77 cents on May 21 to .37¼ cents on November 26. As shown by the table, imports expanded enormously from May to October, the imports in October reaching the huge figure of 13,900,000,000 paper marks, or two and a half times the imports for May. Exports expanded more moderately, from 4,588,000,000 paper marks in May to 9,700,000,000 paper marks in October. When reduced to a gold basis, the exports show an actual decline, from 310,000,000 gold marks in May to 276,000,000 gold marks in October. The monthly trade balance, which in May showed an excess of imports amounting to 928,000,000 paper marks, mounted rapidly in each successive month, until in October the excess of imports amounted to 4,200,000,000 paper marks; in gold marks the change was from an excess of imports of 63,000,000 marks in May to an excess of 120,000,000 marks in October. In other words, exports were discouraged instead of stimulated by the depreciating exchange, and imports, instead of declining, were markedly increased.

II

This paradox is the outcome of a number of factors. Germany's exports are mainly manufactured products. In 1913, 61 per cent of the whole were fully manufactured goods;[1] and as has been pointed out by Stinnes,

---

[1] Of the classes of exports constituting 5 per cent or more of total exports, only coal (7.5 per cent) was not a manufactured product. Cereal exports were only 4 per cent, and sugar less than 3 per cent. Total raw materials were but 16 per cent. Of those exceeding 5 per cent, cotton goods (5.6 per cent) and woolen goods (5.9 per cent) were mainly dependent on imported raw material. Only iron goods (13.3 per cent) and machinery (7.5 per cent) could find the greater part of their materials at home; and with the loss of Alsace-Lorraine and Silesian supplies, Germany would now need, in order to maintain its industry on the same basis as in 1913, to import about 35,000,000 tons of ore yearly compared with 14,000,000 tons before the war.

Rathenau and others the effect of the reparation payments must be to divert export as much as possible to the more valuable finished products. In 1921, 80 per cent of the exports were fully manufactured goods. Under these circumstances, no stimulus afforded by depreciating exchange rates, however powerful, could bring about a substantial increase of German exports for more than a brief period until the raw materials for their manufacture had been provided. It is not surprising, therefore, that in 1919 (the earlier boom period referred to), when trade was fairly free from government restriction, entire factories were dismantled and the machinery sold abroad because the factory could not be operated for lack of raw materials, whereas the machinery brought attractive prices in marks.[2]

The reverse aspect of the same condition is that imports have been dominated by the need of raw materials for manufacture and of food products to sustain the industrial population, which has been so great as to offset the depressive effect of the depreciating mark. With reserve stocks exhausted and fixed plant and equipment deteriorated by the war, imports of this character are the necessary first step toward a return to a normal economic life; this would be the case, indeed, quite apart from the requirements of the export trade and the effects of the reparations program. Also, the loss of farming territory to Poland adds a permanent new element of food imports, to be offset eventually by new manufactured exports; and losses of iron territory to France would make necessary, to maintain the iron and steel industry on the pre-war basis, iron-ore imports of nearly treble the pre-war figure. In 1921 raw materials and food products were 88 per cent of total imports.

---

[2] J. Anton de Haas, "The Present Outlook for United States Trade with Germany," Annals of the American Academy, March, 1921, p. 82.

German imports last year were undoubtedly increased also by the abolition of state regulation of food prices. The law of July 21, 1921 restored the free sale and free pricing of breadstuffs, and at the same time abolished the system of centralizing in semi-official hands the import of breadstuffs and fodder,[3] so that dealers were permitted to import at their own risk. A computation by the Harvard Committee on Economic Research[4] has recently thrown much light upon the expansion of our own agricultural exports last year, in marked contrast with the general decline in other branches of our export trade. In food importing countries, food prices rose relatively to general prices in 1921, owing chiefly to the removal of government price control, and in food exporting countries food prices fell relatively to general prices in accordance with the familiar fact that in a period of liquidation the prices of agricultural products usually fall first and furthest.

The relation of our exports to German imports last year was indeed very striking. In 1913, when United States exports to Germany were 16 per cent of the entire German imports, a larger proportion than was supplied by any other country,[5] they amounted to $351,930,000, against imports of $184,211,000. It 1920 the exports were $311,437,000, against imports of $88,836,000; and in 1921, $372,325,000 (one-fourth of total German imports), against imports of $80,279,000. Last year Germany took 40 per cent of our copper exports, more than any other country, one-fourth of our raw cotton, of which she was the second largest importer, and one-eighth of our wheat exports, being exceeded only by Great Britain and Italy. Our exports to Germany of these three products alone amounted to $213,234,000.[6] But the most significant change compared with the pre-war exports was in food products. Our total food products sold to Germany last year amounted to $140,000,000, against $50,000,000 in 1913, while exports of cotton were $47,000,000 and $168,000,000 respectively, and of copper, $31,000,000 and $47,000,000. German buying of raw factory material is thus still far under normal, while purchases of food products in this country, including finished manufactures thereof, have been unprecedented. Despite imports of cheap German cutlery, toys, and the like, which have excited so much discussion here, it is evident that up to the present, with exports to Germany the largest in our history and imports therefrom less than one-half of pre-war figures, and with an excess of exports to Germany of $424,647,000 in 1920 and 1921, we have had an effective answer to the fears of those who seek protection from cheap German goods by a policy of higher tariff duties.

---

[3] This had been a part of the *Zwangwirtschaft*, whereby industry was placed under the control of the government or of semi-public control associations.

[4] Harvard Economic Service, Weekly Letter, February 18, 1922.

[5] In 1913 German imports from Russia were 13 per cent of the whole, from Great Britain, 8 per cent, and from Austria-Hungary, 8 per cent; no other country supplied more than 5 per cent.

The chief reason for the difference in the behavior of German export trade in the two periods of falling exchange which have been outlined was the trade policy pursued by the German government. The heavy outgo

---

[6] United States Exports to Germany in 1921 and 1913.

	Units of $1,000,000	
	1921	1913
Total	372	352
Food	140	50
Wheat	62	12
Corn	10	4
Flour	12	0.8
Lard	35	20
Copper	31	47
Illuminating oil	1.2	4,5
Lubricating oil	11.6	3.7
Raw cotton	47	168

of goods in the earlier period forced the passage of the export license law of December 20, 1919. To this was added on May 10, 1920, a comprehensive system of export duties ranging from 2 to 10 per cent. The function of the thirty or more foreign trade control boards (*Aussenhandelstellen*) set up under the earlier act has been to prevent the denudation of the home market and to adjust German export prices to world market prices so as to prevent underselling. Minimum export prices were set up, and no licenses were to be issued unless the prices at which the goods were sold corresponded closely to the market price in the country of destination. Because of the difficulty of obtaining reliable and timely information the price adjustment could at best be but approximate. There is evidence too that when the exchange has favored foreign selling the minimum price requirements have been evaded, a favorite method being the use of double invoices, one to secure the requisite license and the other to serve as a record for rebating the customer later on. As will appear presently, however, in periods of active home buying enforcement has been less difficult. Tho only partly successful, the fact that the attempt is being made to prevent underselling abroad is significant. Besides protecting the home market from denudation it apparently indicates a desire not to excite the hostility of foreign governments which would lead to discriminatory action against German goods, against which, under the terms of the Treaty, Germany could not retaliate. With the improvement of the mark in exchange during the spring and summer of 1920 and the approximation of home prices to world prices, widespread complaint against the export duties led to their gradual relaxation and to the moderation of export control generally. In April, 1921, part of the iron and steel industry was voluntarily decontrolled by the state-created Iron Industry Union, and by the end of May the relaxation of control had extended to many of the important lines of export.[7]

This was the situation when the mark began its downward course last May. From May to August the decline was moderate (from 1.5 cents to 1.2 cents) and from then to mid-November headlong, reaching .37 cents, a drop from August of 70 per cent. Export control and export duties were reimposed, and their effectiveness was greatly enhanced by the influence of the depreciating mark upon the home market. As the mark depreciated exports diminished because a heavy wave of home buying was stimulated through the fear that the rising prices would rise still higher. In the autumn months Germans were literally frightened into heavy domestic buying by the prospect of never-ceasing price increases. Complaints against exporting were frequent. Upon the consumers' attacking the Electrical Foreign Trade Board for allowing excessive export, the Board published figures to show that there was no excessive export. The home consumer had bought everything up.[8] And the same was true in most other important branches.

---

[7] Including most textiles, leather goods, wire, small machines, tools, copper, railway cars, etc. Toys and clocks were exempted from license when the act was passed on December 20, 1919.

Besides indicating the effect of the improvement in mark exchange, the relaxation of export restrictions in the spring of 1921 was undoubtedly due in part to a desire to divert exports to neutral countries, not with a view to reparations, but as a retaliatory move against the Allied measures to force the payments required under the Versailles Treaty by May 1, 1921. The German government was particularly hostile to the Allied plan for expropriation of up to 50 per cent of monies due to German exporters for goods sold to Entente countries, and to the "sanctions" policy of the Inter-Allied Rhineland Commission, whereby the control of trade between occupied and unoccupied Germany and the collection of customs were reserved to the Commission. For a detailed account of the system of export control established by the act of December, 1919, see W. Pahl, Die Aussenhandelskontrolle, Berlin, 1920. For detailed comment on its operation and on the export duties good sources in English are the London Economist, Economic Review, Board of Trade Journal, New York Journal of Commerce.

[8] New York Journal of Commerce, Berlin correspondence, December 21, 1921, March 21, 1922.

Owing, therefore, to the need of food and raw materials, the extraordinary effect of mark depreciation on home buying, and the entirely justifiable trade policy which Germany has pursued in consequence of the continually threatening possibility of denudation of a home market stripped bare by a long and severe war, the export trade has not responded to the stimulus of the depreciating exchange value of the mark. On the contrary it seems not improbable that German export trade would respond more sympathetically to a moderate rise in the value of the mark, contradictory as that sounds. By reference to the accompanying table again, it will be seen that the only months since the Armistice in which the German foreign trade has shown an excess of exports have been April and May, 1920, and November and December, 1921, the latter movement continuing into the present year.[9] In both of these periods the mark was rising after a period of violent descent. In May, 1920, the mark reached 2.34 cents, compared with 1.08 cents the preceding February. In December, 1921, the mark rose to .61½ cents from the low point of .37½ cents in November and experienced no further pronounced change until March. The domestic buying fever came to an end early in December when the mark began to improve strongly, and considerable stocks of goods manufactured during the boom period had then no other market than the foreign one. After the steadily increasing excess of exports from November through February it would be interesting to know what the trade figures will show for March, when the mark again fell to a new low level.

Despite the improvement in recent months, however, it is not likely that there will be an expansion of exports

---

9. In January, 1922, exports exceeded imports by about 36,000,000 gold marks and in February by about 48,000,000 gold marks.

sufficient to make possible substantial reparation payments until Germany's pre-war markets in eastern Europe have again been opened up.[1] Before the war Russia, Austria, and the Balkans took about one-fourth of the German exports; the European neutrals, Holland, Switzerland, Spain, and Scandinavia took about one-fifth; and France, Italy, Great Britain, and Belgium about three-tenths. The United States and all other non-European countries combined received about one-fourth of total German exports. In 1920, only 15 per cent of German exports went to England, France, Belgium, and Italy (exclusive of reparation payments in kind); Holland, Switzerland, Spain, and Scandinavia took 49 per cent; but Germany's attempt to reopen trade with Russia, Austria, and the Balkans was a distinct failure. More recently, however, we have had encouraging reports concerning Russo-German trade possibilities. It was recently reported by our commercial attaché that arrangements had been made by a group of German manufacturers and bankers to furnish to the Russian Soviet government a credit of 100,000,000 marks to finance German exports to Russia. This figure, however, is merely nominal, since the German bankers state that the initial credit will not exceed 5,000,000 marks. The granting of credit to Russia seems to represent the expectation of a return to a more normal condition in that country, and the recognition that the Russian market is vital to Germany's economic future. Russia has raw materials essential to German industry, and Germany has machinery and other products needed in Russia. The Pravda of Moscow recently announced, concerning the proposed order for locomotives and machine tools, worth 4,000,000,000 paper marks, that Russia would pay the German shippers one-seventh in gold, would receive a credit for three-sevenths until July, 1924, and would pay the remainder in mining and forestry concessions in the provinces of Bietka and Vologda.[2] As early as last November the Russian commissary Zinovieff stated that certain German firms were ready to supply goods to Russia on payment of only one-tenth in cash, the reason assigned being that they were bound to regain the Russian market at any cost. Reports of this character are extremely suggestive. If the economic conference at Genoa could accomplish nothing more than the reopening of Russia and eastern Europe to trade with Germany and other countries, that accomplishment alone would justify the calling of the conference.

---

[1] Professor Taussig's prediction that German trade recovery, on a scale sufficient to pay reparations, would depend on the Russian market is even more convincing now than when made in 1919; see "Germany's Reparation Payments," American Economic Review, Proceedings, March, 1920.

Until the Russian trade develops, however, there seems little likelihood of a German export balance sufficient to pay reparations of substantial amount. How, then, have cash payments been made at all, and how, in addition, has Germany paid for her large excess of imports since the Armistice? Partly she has paid by selling marks to foreign investors and speculators. In other words, she has paid for some of her food and raw materials with issues of paper marks a year or more ago which are now worth nowhere near what they were then, and these creditors draw no interest and cannot demand payment in gold or in kind. Partly she has paid by balances created in other countries through transfer of

[2] New York Times, January 16, February 3, 6, 15, 26, 1922. The Soviet's report for 1921 shows that one-third of the imports via Petrograd were German. Of 1,551,000 Russian poods of metal wares delivered in all Russia during November, 1,354,000 came from Germany. The Soviet commercial agency at Berlin reports that in 1921, Russia gave Germany 1250 orders for goods, aggregating 800,000,000 marks, of which 140,000,000 marks represented chemicals. Two foreign trade companies have been organised in Russia this year, the Soviet Commissariat for foreign trade owning 51 per cent of the stock and private individuals in Russia and elsewhere, chiefly in Germany, owning the other 49 per cent. The Daily Metal Trade, March 1, 1922.

German capital. According to the *Tagliche Rundschau*, between forty and fifty billion marks have gone to Switzerland alone.[3] At recent rates of exchange this would be something under a billion gold marks. The amount that has flowed into Holland has been estimated as high as $200,000,000.[4] The law against "capital flight," which would have expired on March 31, 1922, has been prolonged until March 31, 1923, tho the amount that may be taken abroad by travelers is raised from 3000 marks to 20,000 marks. Negotiations are under way with several states for mutual help against tax evaders, and an agreement has been concluded with Czecho-Slovakia, but apparently most of the neutral states have been reluctant to abandon their tradition of secrecy for banking accounts.[5] In part, too, the imports and the reparation charges have been paid for by transfers to foreigners of German business concerns, factories, and real estate. Foreign investments in Germany since the Armistice have been estimated as high as fifty billion marks, or something under $250,000,000 at recent exchange rates. With the external value of the mark depreciating more rapidly than the internal value, investments in Germany by outsiders have been obviously profitable. Foreign holders of German bank notes, also, are reported to have employed them for a similar purpose.[6] It should be borne

---

[3] New York Journal of Commerce, February 1, 1922.

[4] New York Times, December 24, 1921.

[5] London Economist, March 4, 1922.

[6] See Daily News Record, March 9, 1922, Economic Review, January 6, 1922. The Svensk Handelstidning, which sent a special representative to study Germany conditions last December, gives the following estimate of the German balance of payments:

"Germany's accumulated adverse trade balance for the war years amounts to (gold) mk. 10 milliards. In 1919 her trade deficit was (paper) mk. 30.3 milliards, and in 1920, about 52 milliards. Adding 12½ milliards for export of foreign money and securities, and about 30 milliards for freightage on foreign shipping, the total of these deficits may be put at 130–140 milliards. How are they balanced? Some 30 milliards in German notes are held abroad, including 9 milliards by the French and Belgian governments (from in mind, however, that the same difference between the external and the internal value of the mark which makes profitable the inward movement of capital would make unprofitable the transfer in the other direction, except to the lower exchange countries of eastern Europe, and except, too, when the tax to be escaped exceeds the loss on the exchange; so that one wonders by what means capital has been smuggled out of Germany on so vast a scale as reported. That the smuggling has occurred, the multiplicity of reports, and the government measures taken, leave little room for doubting.[7]

Germany appears also to have obtained her imports in part by barter, or methods approaching barter. A good example is the exchange of raw materials for their equivalent in finished products through the Swiss Barter Institute, and by private organizations like the Central European Trading Company of London, which deals with the firm of Schubach, Thiemer & Co. of Hamburg.[8] More important is the growth of the *Veredlungsverkehr*,

---

occupied districts); 30 milliards represent foreign bank credits, and 15–20 milliards other credits. The remaining 50 milliards must have been invested in the purchase of German real wealth, property, shares, industries. These purchases were extremely profitable, as the price of city property has only tripled, and that of country property sextupled since normal times. It is, then, indisputable that the loss in the mark's value has been met by the pauperisation of the German people." Economic Review, January 6, 1922.

[7] A very interesting explanation of one method of doing it is given in the Berlin correspondence of the Daily News Record, February 7, 1922:

"For several months, more than a few German firms have been conducting their overseas trade through dummy corporations in Rotterdam or Zurich. These companies, with nominal capitalization, placed orders for raw materials and figured as the direct selling agents of the goods fabricated in Germany. The most popular tax dodging scheme was for the small foreign corporation, with a credit in the country of its origin, to get the raw material and to ship it to the German mill under a supposed contract refining agreement. The mill here manufactured the goods and received the labor cost, plus a minimum of legal profit, in compensation, and the real but hidden profits derived from the sale of the merchandise reposed safely in the account of the ostensible selling corporations across the frontier. These are the profits the German government is now attempting to locate for taxation purposes."

[8] J. Anton de Haas, "The Present Outlook for United States Trade with Germany," the Annals of the American Academy, March, 1921, p. 86.

a system of international coöperation especially encouraged by the German government, whereby the German manufacturer is given raw material on the understanding that he will deliver the finished product to the foreign merchant, the latter to retain ownership throughout the process.[9] Foreign firms, too, have been given a direct interest in German concerns, or companies have been formed in which foreign and German concerns have participated. This has been the case in the oil and margarine industries with the Dutch, in the rubber industry with the British, in ores with the French, and in electrical and textile industries and in shipping with the Americans. By this means raw materials have been secured and a field ensured for the sale of the finished product. In harmony with these changes has been the internal organization of industry, particularly the intensified growth of syndicates, which have reached new proportions in iron and steel, shipping, chemicals, automobiles, the oil and fat industries, brewing, electrical goods, and other lines.[1]

III

The German experiences with foreign trade which have been reviewed furnish some interesting light upon the theory of foreign exchange under inconvertible paper. It seems evident, for instance, that too violent a descent of the rate may check rather than encourage export, not only by precipitating a buying panic at home such as occurred in Germany last fall, but by throwing exporters, as well as importers, into confusion. With the mark falling so fast last October and November exporters were afraid to quote prices. It is evident, too, that the stimulus of the declining rate is operative only when exports are invoiced in the foreign currency, for the decline in the *internal* value of the mark would render it hazardous for German exporters to enter into time contracts for the receipt of payment for exports priced in German marks. Eighteen foreign trade boards, including those for chemicals, pottery, wood, cement, iron and steel, ships, paper, and leather, issued regulations requiring exporters to high-exchange countries to invoice to the customer in the foreign currency.[2] German exporters refused to sell to Italy except in lire, all unfilled orders to be canceled if those terms were refused.

---

[9] To protect the foreign firm a number of trust organizations have been created which guarantee that the raw material provided will be used as agreed in the contract, and that the property rights of the foreign firm will be protected; ibid.

Adoption of the method of the Veredlungsverkehr has been suggested, in the form of a modification of the Wiesbaden Agreement, as a means of facilitating reparation payments in kind. This is the so-called plan for "free negotiations."

[1] Statist, February 19, 1921.

That, with these limitations, the stimulus was present, tho obstructed in the later period reviewed by trade restrictions and other influences, is shown by the course of prices. An index of export prices is not available, but prices of individual export groups bear plain evidence. The rise of textile prices, a principal branch of export, was extremely rapid last year during the period of falling exchange. With a base of 100 in 1913, the index for this group was 1773 in May, 1921, 4176 in October and 6518 in November. This was nearly double the November index for all commodities (3416).[3] Export and internal prices for earthen and chinaware, chemicals, worsted yarn, pocket knives, and dolls, collected from invoices, showed an increase of the export price over the internal price of 20 to 216 per cent for the various classes of goods.[4] J. M. Keynes indicated last November the discrepancy between the internal and the external value of the mark very ingeniously by pointing out that at the then existing exchange of 1200 marks to the pound sterling "the value of the entire note circulation would be below £80,000,000, which is less than one-fifth of the British note issue, altho Germany uses notes much more and checks much less than we do. There is the further paradoxical result that, since the gold reserve of the Reichsbank is worth nearly £60,000,000, the total circulation of notes valued at the present rate of exchange (and leaving out of account the unfunded debt) is covered by gold to the extent of 75 per cent, a

---

[2] Manchester Guardian, November 5, 1921.

[3] This is the "Federal Wholesale Index," of which the textile price index quoted is a part.

[4] German Internal and Export Prices

Commodity	Amount of invoice at German internal price	Amount of invoice at export price	Difference	Percentage increase over internal price
Decorated chinaware..........	5,141.67	6,246.50	1,104.83	21
"	1,016.09	2,225.53	1,209.44	119
"	954.58	1,414.16	459.58	48
"	448.40	612.50	164.10	37
"	263.27	532.50	269.23	102
Porcelain	37.57	84.20	46.63	124
"	802.03	1,816.32	1,014.29	126
Earthenware	103.77	328.00	224.23	216
"	1,141.41	3,003.37	1,861.96	163
Locks	967.50	1,212.70	245.20	25
Chemicals and laboratory supplies	79,563.00	106,364.00	26,801.00	34
Sundries (aluminum ware, pocket knives, dolls, etc.)	2,784.00	4,617.00	1,833.00	66
Worsted yarn	19,413.30	53,282.22	33,868.92	174
"	12,870.11	16,666.32	3,796.21	30
"	14,888.94	18,328.77	3,439.83	20

Both internal and export prices were given on the invoices, together with the rates of exchange to be applied to the quotations. Therefore the figures in the table represent actual transactions between specific firms on a particular date, chiefly in April, 1921. Many of the export prices run over 100 per cent above the internal quotations, but there is little consistency among them. One shipment of decorated earthenware, for example, may run 20 per cent above the domestic price and another may be over 200 per cent in excess. The whole series of quotations seem to indicate that the German manufacturers were charging American purchasers what the traffic would bear. This conclusion implies no condemnation of German methods, but the table shows that Germany has an advantage over foreign competitors in the chinaware industry because of depreciated exchange alone.

From "Depreciated Exchange and International Trade," U. S. Tariff Commission, 1922, p. 53.

figure rivalled only by the Federal Reserve Banks of the United States." [5]

The German price situation thus bears out the view that in a period of depreciating exchange export and import prices rise first and in close sympathy with the exchange, whereas the rise in internal prices follows more slowly, the gap between the two providing a stimulus to exports and a burden upon imports. It indicates unmistakably also that the price changes *follow* the changes in the exchange rate. It is equally clear that in this instance the increase in note issue has *followed* the decline in exchange and the consequent rise of prices. As the *Economist* has pointed out, one might even argue humorously that increases in note issue have been good for the exchange, since in 1921 the rate of increase in note issue was only about half that in 1920, but in the whole year 1920 the mark fell only from 50 to 73 for the dollar, whereas in 1921 it fell from 73 to 310.[6] The greatest rate of increase in note issue yet recorded was in the first half of 1920, when the circulation rose from 49,807,000,000 marks to 67,608,000,000; yet in those six months the mark exchange rose from 50 to 38 for the dollar, and between the end of January and the end of May when inflation was most pronounced of all the mark recovered from 104 to 35. Likewise in 1921, during the period of falling exchange, note issue rose but five billion marks from the end of May to the end of July, three billion marks in August, six billions in September, five billions in October and nine billions in November, the months of sharpest exchange depreciation, but increased thirteen billions in December when the exchange rate improved almost 100 per cent.

[5] Manchester Guardian, November 9, 1921.

[6] London Economist, November 19, 1921; see too a very interesting and suggestive article by Robert Crozier Long, Fortnightly Review, December, 1921.

So far as the German case is concerned, it is evident that to demand restriction of inconvertible paper as the fundamental cure for depreciating exchange is to beg the question; the Reichsbank has not inflated for its own amusement. The same may be said of the view that the fundamental cure must be to "balance the budget"; that budgetary deficits necessitate further note issue to cover the deficit, and that the increased issue causes further increase of prices and hence depreciation of exchange. The first part of the statement is true so far as it goes, but it does not start far enough back. What causes the budgetary deficit? It seems unmistakable from Germany's experiences last year that the sequence of events was as follows: the reparation payments by greatly increasing the pressure of demand for foreign bills wherewith to make remittance, and also by impairing confidence, drove down the value of the mark in exchange. Import and export prices rose in close sympathy with the exchange, and domestic prices followed upward more slowly, external and internal prices tending to equalize gradually whenever the exchange quieted down or improved, and also toward the end of the period of extreme depreciation, by reason of the effect of the domestic buyers' panic in October and November. With prices rising, the state and private demand for credit was increased. To meet customers' demands for bank notes, bankers, holding their liquid assets mainly in treasury bills and only a minimum of the non-interest-bearing Reichsbank notes, would present treasury bills for encashment in bank notes, increasing the Reichsbank's holdings of treasury bills and forcing increased issues of bank notes in payment. At the same time, since the revenue of the government is relatively fixed in the budget, whereas expenditures increase continuously with the rise of prices, the resulting deficit compels further issue of bank notes and treasury bills. If this analysis is correct, relief for Germany's financial and monetary difficulties must be sought in the reparations question and the foreign trade, rather than in some point farther down the chain of consequences.[7]

JOHN H. WILLIAMS.

HARVARD UNIVERSITY.

---

[7] It is not intended to deny that in an inconvertible paper situation the multiplication of note issues is *one* major cause of exchange depreciation, the reasons compelling increased issue being usually both internal and external. For criticism of the doctrine of "purchasing power parity" and its applicability to the German case, see John H. Williams, "Foreign Exchange under Depreciated Paper: A Criticism of Cassel's Doctrine of Purchasing Power Parity," Journal of the American Bankers Association, January, 1922.

REVIEW

COLE'S "THE DOMESTIC AND FOREIGN WOOL MANUFACTURES AND THE TARIFF PROBLEM"

THE first and most natural thought that will occur preliminary to any review of Dr. Arthur H. Cole's able article, "The Domestic and Foreign Wool Manufactures and the Tariff Problem," which appeared in the November (1921) issue of the *Quarterly Journal of Economics*, will be one of deep appreciation of the extensiveness and general excellence of Dr. Cole's survey, and his entire freedom from partisanship in the presentation of his findings. It is not surprising that the article has created widespread interest and comment among students of wool manufactures, for it is without question one of the most notable contributions that has been made to the literature of that industry for many years by anyone who has been able to bring to the task that personal detachment and distinctly judicial measurement that Dr. Cole has so successfully maintained throughout his discussion.

But in proportion as Dr. Cole's analysis of the comparative and competitive positions of the domestic and foreign wool manufactures is above the average merit of such papers, it sets for itself a standard under which the author's occasional too great brevity, or failure to pursue a phase of the inquiry to its logical conclusion, stand out in more contrast than they would in another article of less general excellence. Therefore, while an attempt will be made here to review Dr. Cole's discussion in a rather comprehensive way, the thoughts to be offered in this brief *critique* will be more supplemental than controversial in character, and, it is hoped, will only be critical where they can be constructive, by perhaps throwing some additional light upon the particular matter under examination.

It would seem that there is something short of full and complete discussion in Dr. Cole's reference to the depleted wool supplies of the European countries at the close of the war and since. While it is true that in the months immediately following the armistice those countries did experience difficulties in procuring wool in sufficient quantities for their needs, it is also a fact that those difficulties have been so far overcome that Germany's importations of wool in recent months have substantially exceeded those of a corresponding period in the years preceding the war. In the past year Germany's importations of South American wool have exceeded those of any other country, being largely in excess of those of the United States and Great Britain; and in addition to these large supplies, Germany has been a heavy buyer at the English and Continental sales, and also has secured large quantities in the primary markets of Australasia. Upon the other hand, neither Belgium nor France has experienced any difficulty during the past year in obtaining all the wool that could be used. While Poland and Czecho-Slovakia probably have not yet progressed so far in this respect, plans partly consummated and partly in course of consummation give assurance of a satisfactory flow of such raw material to those countries during the ensuing year.

In the course of offering supplemental facts, it will be necessary, too, to express some disagreement with Dr. Cole's statement that labor cost data on the current situation are scarce and difficult of ascertainment. Information concerning labor costs in Germany is not lacking, for copies of the complete official wage agreements for the German industry have been made available, and translations have been extensively published in the trade papers of this country, and in the Reports of Hearings held by the Ways and Means Committee of Congress. Subsequent changes in the schedule also have been reported from time to time during the past year, the latest showing an advance of 105 per cent from October, 1920, to November 1, 1921, in which time the value of the mark had declined from 1.3 cents to 0.35 cents. So, while the decline in the mark would have required an increase of 371 per cent to have sustained the wage rates at even their low level of October, 1920, the actual advance was but 105 per cent, which in effect means that, competitively, German wages in the woolen industry have been reduced by 71 per cent. Of course, further advances in wages must and will be made; but the *lag* in adjustment of wage rates to depreciated currency is so great that a long time must elapse before earnings can be brought to anywhere near the pre-war German rates, which then were far below the pre-war wages in the United States. As our American rates are now upwards of 120 per cent higher than in 1913, the disparity in labor costs has become grotesque. And labor being by far the greatest factor in conversion cost, any disadvantage which Germany may have in fuel cost is far outweighed by the *increase* in the spread between the labor costs, to say nothing of the preëxisting difference.

But entirely apart from the abundantly available data concerning costs is the more convincing evidence offered in prices quoted for conversion of raw material, and the prices at which yarns and fabrics are being freely offered for sale by German manufacturers.

The principal cause of the alteration (*increase*) in competitive strength should *not* have been difficult to ascertain. In the case of Germany, for example, it is clearly due chiefly to the indirect lowering of wages resulting from a depreciating currency, increases of wages not keeping pace with the decreasing value of the money in which they are paid. A secondary cause is the assumption by the government of a part of the cost of some of the services to industry, as, for instance, a portion of the costs of transportation.

Neither cause can be permanent. Depreciation of currency will cease when that currency no longer has a value as money, at which time some new and more stable circulating medium must replace it. With a stable currency, wages will, in time, reach a more stable level, altho that level may, and probably will, be somewhat lower than before the war, because of the impoverished condition of the people. The lower standard of living mentioned by Dr. Cole is an effect, rather than a cause. When currency depreciation is complete, the government will no longer be able to subsidize industries by assuming part of the expenses properly chargeable to the production costs of those industries (such as transportation), because the government will find it impossible to finance such payments with additional issues of paper money.

In countries where the depreciation of currency has been much less serious, the result has been the same in kind, altho less in degree; consequently in Great Britain, France and Belgium, labor costs are not so low as in Germany, altho much more below the level of wages for similar occupations than before the war. If these countries check the depreciation of their paper money by restricting its issue, wages will, in time, stabilize at the current value of the paper money, so that the purchasing power of labor probably will be only slightly lower than before the war.

Dr. Cole refers to the fact that, largely as an indirect result of the war, British manufacturers have adapted themselves to the use of the lower, as well as the higher, grades of raw wool, altho previous to the war these lower grades, which require chemical treatment to eliminate the vegetable matter, had to be disposed of on the Continent; and he is inclined to regard this as a permanent broadening, and therefore advance, in the technique of British manufacture. We lean more to the view that the use of the inferior wools mentioned was a war necessity, like the use of inferior kinds of bread in the United States, and that as a consequence it is unlikely that, with the passing of the necessity, the use will continue to more than a limited degree. Indications afforded by the wool sales already seem to show a tendency to return to former standards of selection. It is altogether probable that the same causes will continue to operate (some of them obscure, others related to varying national types of product) which originally influenced the use of certain wools in the Continental countries which were not acceptable in Great Britain or the United States.

In a somewhat similar way may be explained the employment of the South American low crossbreds in our carpet trade. This seems to have been due to the abnormally low prices at which these wools have sold, these low prices resulting from large stocks accumulated by reason of the derangement of transportation and manufacture by war, and happening at a time when much of the usual supplies of carpet wools originating in Russia and the Orient were cut off.

This brings us to that section of Dr. Cole's discussion which he directs to technical equipment, with especial reference to the automatic loom, the continuous woolen spinning frame and the warp mill.

The automatic loom, for woolen goods which require more than one shuttle, is a sufficiently recent innovation to be still in the development stage. It is gradually being adapted to an increasing range of fabrics, but for many kinds of cloth its use is still regarded as experimental.

The continuous woolen spinning frame also is so recent an innovation that there has not yet been time for its possibilities to be thoroly investigated and tested. It first came under notice just prior to the beginning of the war, and was then a novelty even on the Continent.

Of all of these, and without questioning their ultimate value to the industry, it may be said that the basic machinery of a textile plant, and its employment, are of such a nature that revolutionary changes cannot be made quickly. It requires time to determine the factors of practicability, economy and adaptability to the product of each kind of goods, before the risk of heavy capital expenditures can be incurred.

In his final paragraph upon this subject, in which he refers to warping and hand-dressing, it is not clear whether Dr. Cole is distinguishing between the old-fashioned upright warp mill (turned by hand power) and the horizontal sectional warp mill operated by mill power, or between the latter and the "slashing machine." If the former, he can hardly mean that the hand warper with vertical creel is in general use in American mills. It is still employed to a limited extent, but in work for which it is the most suitable appliance, e. g., the making of short, sample warps. If his reference is to the use of the "slasher" as contrasted with the sectional warp mill, he overlooks the fact that the "slasher" is only of advantage in the manufacture of certain kinds of goods for which large lengths of identical warp are employed. The sectional mill is the better where (as in the case of many kinds of patterned and some plain goods) the quantity to be of one pattern is much smaller.

Altho it was perhaps unconsciously so, Dr. Cole's résumé of the activities of the British woolen industry in scientific research was in a vein that would be likely to lead the average reader to believe that the British industry is far ahead of the American in that respect. The lead, if any, that the British may hold in this respect is so slight as not to be of any advantage. The work of their Research Association is so new that it can still be measured in months. Prior to the recent institution of coöperative research work by British manufacturers, it is probable that more was being done by individual American mills than by individual British mills. And altho they have a little the start of our industry in the coöperative undertaking of such research, it has been under serious consideration here for some time, and it seems not unlikely that the plan proposed several years ago on behalf of one of the associations in this industry may be given practical effect. That plan contemplated the utilization of the excellent equipment of the Bureau of Standards in coöperation with and under the practical counsel of a committee representative of the industry. In the Bureau of Standards the government has the nucleus of a splendid textile research laboratory, but thus far the work accomplished there has been for the most part of too academic a character to have much practical utility for the improvement of productive processes and methods. It may be noted in passing that the author gives further evidence of attaching undue weight to the recent British and German movements in technical inquiry, when, in a later part of his article, he expresses no hope whatever of any great invention or refinements of process originating in this country.

Dr. Cole mentions the decline in the British standards of acceptable workmanship; but this disadvantage is not peculiar to Great Britain. In the United States, as probably in all countries participating in the war which had well developed wool manufacturing industries, there was a serious deterioration in standards of production, in respect to both quality and efficiency. The causes were: (*a*) the withdrawal of many skilled workers for military service and manufacture of munitions; (*b*) the diversion of production to goods for military use (uniforms, blankets, etc.) which by reason of their plain and staple character and coarser structure did not require the skill and refinement of manufacture and finish that goods for civilian use did; (*c*) the government's urgency for quantity output, which was of necessity opposed to that carefulness requisite for the old standards; (*d*) a general shortage of labor, which made the procurement of other employment so easy that operatives who were not naturally painstaking could not be held if old standards were maintained. Recovery from this, one of the minor demoralizations of war, will come with the general liquidation through which all industries are now passing.

It would have been exceedingly interesting to American woolen manufacturers if Dr. Cole had submitted a comparison of actual figures in support of his statement that coal, dyestuffs and taxes, as elements of expense, have increased more in Great Britain than here. The percentage of increase in the cost of coal may be greater in Bradford than in New England, but the actual cost there is still less than here. With regard to dyestuffs (a comparatively small fraction of the total cost of manufacture) the relative charges are not notably different. As to taxes, the system in both countries is so complicated that general comparisons are impossible. No figures showing the total taxes for the woolen industry of either country, or the average rate for that industry, being available, comparisons can, therefore, only be made between particular establishments of similar capital and earnings, in each country. From the limited data accessible it would appear that for the smaller establishments there may be a little advantage here, and for the larger mills with earnings greater in amount but not in percentage, the disadvantage is with the American mill. This is one of the points upon which Dr. Cole might have procured definite information.

American manufacturers may, with justification, take exception to the phraseology in which Dr. Cole, in opening that phase of his discussion relating to questions of labor, refers to British "manufacture of somewhat better goods at somewhat less cost." If comparison be made between similar kinds of American and British goods, the characterization of the latter as "somewhat better" is of doubtful applicability. The finest cloths made in the United States will compare favorably with the finest made in England. Of the major quantity of goods made in both countries — the great yardage of pure, new wool fabrics (largely worsteds) of good quality and medium price — the advantage in quality is with the goods made in the United States. In the lower grades, made largely of by-products and substitutes for new wool, it has generally been conceded that the English mills are more skillful. The phrase "at somewhat less cost" is *somewhat* less than expressive of the full measure of difference between the conversion costs of Britain and the United States.

Dr. Cole then makes the statement that "comparatively and absolutely the American labor forces have probably improved in character in recent years"; and that "at least, were another investigation to be made such as that of the Tariff Board into the turnover in the American mills, it is unlikely that such extraordinary frequency of movement into and out of the wool manufacture, and from one mill to another within the industry, would be shown." If there has been any improvement in the skill and efficiency of the average workers in the domestic industry since 1911, or if the labor turnover has been reduced as compared with its ratio at that time, it would be welcome news; but just as Dr. Cole explains was the case in Britain, and as we explained, a few paragraphs back, its similarity here, the derangements and demoralizing influences of the war have operated in just the opposite way.

As to what Dr. Cole describes as the "orderliness" of the British industry — that is, its established channels for the settlement of wage problems — it is true that wage agreements in the British industry have generally been attended with little difficulty; and the experience there is being studied with care and interest by leaders of the industry here. The concentration of authority in the negotiation of the agreements in Britain has not, however, proceeded so far as Dr. Cole appears to think. Separate crafts exercise quite distinct control, and in connection with wage agreements some of these crafts have by no means so completely avoided disputes and strikes as he intimates. It will be time enough to compare the results there and here when the liquidation of war rates has been more nearly completed than it is at present. In the consideration of labor relations it must not be overlooked that, due to the longer period of training, the trades unions in Great Britain have evolved a type of leadership much better qualified to negotiate understandingly and with comprehension of controlling economic conditions. In one particular the British industry acted with much better judgment and with clearer vision, namely, in relating wage rates to cost of living and tying the movements of the one quite closely to those of the other. This arrangement, if it continues to function as well in the future as it has thus far, will prove, as Dr. Cole states, an added element of strength for the British mills in competition with those of the United States.

In commenting upon the opening remarks of Part 2 (United States Technical Equipment) of Dr. Cole's paper, we might point to these as containing another misleading implication, i. e., that it is by the manufacturers (employers) that this protection is enjoyed. The word "producers" is really used, but since the context has reference to manufacturers it will of course be read as synonymous with manufacturers. From a political opponent of the system of protective tariffs such an implication is to be expected. But the student of economics must recognize that the purpose and effect of such tariffs is to protect and sustain a higher wage level. He may consider that an unwise policy and may question the benefits derived from it. He may strongly and logically oppose such a policy. But if he is a thoro and an honest student of the subject he will neither deny nor evade the fact that with labor costs what they are here and abroad, the domestic woolen industry could not continue in operation without it, and with wage costs the same here and there the industry here could operate as successfully and as prosperously as in Europe. There may be room for difference of opinion as to whether the woolen industry is worth having, and as to the advantages of the higher wages; but a thoro and unprejudiced investigator could not doubt that in the case of woolen manufacture the high American wage rates cannot be sustained without high tariff rates; that whether judged by specific examples or by the industry as a whole, British woolen manufacturers (proprietors) have been, during the periods of the Dingley and Payne-Aldrich tariffs, as successful and prosperous as those of the United States. Conscious of these facts, such an investigator would not allow those who read his report to derive the impression that it was the manufacturers who were enjoying the protection of the Payne-Aldrich rates. It is but fair to Dr. Cole to assume that he used the word "enjoying" in the sense one does when saying that he is "enjoying good health," that is, in a normally sound and healthy condition. But such use is obviously unsuitable in any case where it will convey an erroneous impression of the attending circumstances.

In his estimate of the effect that the Underwood tariff would have had upon the domestic woolen industry if the war had not intervened, Dr. Cole justifies most of the criticisms here expressed. He says "some sections of it would have had to curtail operations or shut down completely." But in his qualification that "the whole industry would by no means have 'gone to pot,'" he fails to comprehend that it would be impossible for a part of the industry to continue in successful operation while some sections had to curtail operations or shut down completely; for if it had been possible to continue the manufacture of certain products, intensified competition to obtain the restricted volume of business left for domestic mills must unfailingly have brought all to the same general state of idleness, or restricted production and short-time employment. Only for a very short period is it possible for part of the industry to continue in full and prosperous employment while all the rest is prostrate. At such a time the attention of the less fortunate mills is immediately diverted to the kind of production which is in a better estate; and the output of the latter having been always equal to the demand, a large invasion of their field would curtail operations, cause unemployment and turn profit into loss, first by direct price competition, and still more powerfully and effectively by increase of the unit overhead cost.

While Dr. Cole correctly estimates the influence of the war in suspending the consequences of the Underwood Tariff, not only preventing entirely competition from foreign woolen manufacturers but creating a great military need for the products of the domestic mills, he might have added that this adventitious and wholly deplorable intervention has engendered a false confidence in the sufficiency of the Underwood rates. Even among manufacturers and workers there are many who, content with their war-created prosperity, are apathetic to the subject of tariff legislation. To the indifference of ignorance and the interested propaganda of the international bankers the Congressional delay in tariff revision is largely attributable.

Again the lack of complete explanation is likely to lead the general reader to entirely wrong conclusions, where Dr. Cole refers to domestic wool manufacturers being "content" under lower tariffs prior to the Civil War. He neglects to note that the Civil War itself increased the disparity between American and European wages; to sustain which increased disparity, higher tariff rates were inevitably necessary. He also overlooks the fact that prior to the Civil War the woolen industry in the United States was comparatively undeveloped, being then nowhere near able to supply domestic requirements, either in quantity or variety of production. The tariff rates of that period had not been sufficient to so expand the industry as to make the country independent of foreign supplies. The policy adopted in consequence of that war had for its express purpose the development of the industry to the point where it could be capable of completely supplying the requirements of the country, which it did, at the same time greatly improving the quality of goods made, and greatly reducing the relative prices of all qualities.

Dr. Cole calls attention to the fact that "while weaving capacity has increased at most 15 per cent, the number of woolen spindles has increased over 25¼ per cent, French system worsted spindles 65 per cent, and worsted frame spindles nearly 25 per cent." That worsted yarn production has, in recent years, increased in larger ratio than weaving capacity, is accounted for by three quite natural causes, namely:

(1) The constantly increasing preference of the public for worsted rather than woolen suitings. During the past thirty years there has been a progressively increasing diversion of looms to the weaving of worsteds. This has made necessary a greater increase in spinning than weaving capacity.

(2) The enormous increase in the use of knitted garments made of worsted yarns. Looms not being employed in the fabrication of knitted wear, the increased installation of yarn-making machinery for this purpose has no corresponding increase of looms. To judge of the relative growths of yarn-making and yarn-consuming machinery, looms and knitting machines should be considered together.

(3) The public preference for fabrics of lighter weight and finer texture has been steadily increasing for at least ten years past. Cloths of this kind have to be made of yarns of finer size, to spin which a proportionate increase in the number of spinning spindles is necessary.

The case of woolen yarns is somewhat different. In proportion to the diversion of looms from the weaving of woolen to the weaving of worsted goods, there was need for fewer woolen spinning spindles, and for a number of years the decreasing number of cards and spindles was quite evident. This was to some extent arrested by the increasing preference of the public for fabrics of lighter weight, made of yarns of smaller diameter, to spin a given quantity of which more spindles are required. This tendency has already been referred to above, in the case of worsted yarns.

Much the larger part of the recent increase in the equipment for making woolen yarns was a result of the demands of the United States government for an enormous output of blankets, overcoats, uniforms, leggings and other woolen articles for the army and navy. To the extent of this increase the woolen spinning capacity of the country is probably redundant, and it is not unlikely that a decrease rather than an increase in woolen cards and mules will appear in the next census returns, altho the present large use of knitted garments, supplemental to other clothing, results in some increase in the employment of woolen yarns, not comparable, however, with the increased use of worsted yarns by the knitting branch of the industry.

Dr. Cole refers to the increased call for yarns of finer size, but thinks "the production and use of such yarns is less satisfactorily fitted to American conditions than in the case of the coarser yarns." This conclusion is not substantiated by experience. It is not a fact that in the manufacture and employment of fine yarns the speed of spinning spindles must be lowered, and that of the loom modified. It may be true, in some respects, that greater care is required in the making and the use of these yarns; but even that may well be questioned. The very greatest care and skill is undoubtedly required in the use of some of the coarser counts of yarn which enter into the construction of fabrics which have to be subjected to finishing processes necessitating a high degree of skill and care in the making of the yarns. But neither the spinning of the yarns nor their subsequent use present technical difficulties that American mills have not been able to successfully meet, as is convincingly shown by the vast quantities of such yarns that have been made and used in American mills. Altho spindle and loom speeds do not have to be reduced, it is true that the output in pounds per spindle, and in yards per loom, is less for fine than for coarser yarns. This, of course, is merely a consequence of the fact that the finer the size the less the weight per yard of yarn, and the greater the number of threads (picks) that must be woven into a given length. This means that the labor cost, and the total conversion cost, are higher per pound and per yard than for heavier yarns and fabrics; not, however, because of slower speeds or greater skill, but because a given amount of labor and expense are applied to a smaller quantity of material. Such goods, in which the ratio of conversion cost to material is relatively high, naturally show the greatest percentage of variation between foreign and domestic costs, because of the larger element of labor — not because of technological difficulties. Under the Tariff Law of 1909 the finer sizes of yarns were not made in the United States, not because skillful operatives and suitable equipment were lacking, but merely because the *ad valorem* duty was insufficient to offset the differentiation in conversion cost. Goods made of these finest yarns being in the luxury class, duty should be comparable with that for silk goods, which would be quite sufficient to permit their manufacture here, and which would, in addition to increasing opportunities for domestic employment, provide the means for training a larger number of operatives to the highest degree of skill.

While Dr. Cole mentions the kind of fabrics for which the French system yarns are used, he does not seem to fully comprehend that the characteristics of the French yarns are essential for such goods and therefore assure a legitimate demand for such yarns so long as the conditions are propitious for making in American mills the kinds of cloths for which they are adapted. There is, therefore, no "questionable advantage to the American industry as a whole in the production of these yarns." There are no technical obstacles to their successful production and use, and they are essential to the making of certain classes of goods that ought to be made in the United States.

It is probably true that foreign competition may be strongest with respect to those yarns made by the system generally employed in the Continental countries of Europe and the goods made in those countries from such yarns. This, however, will not be due to any inaptitude for the manufacture of such yarns and goods in American mills, where the necessary ability and skill already have been demonstrated on a large scale. The strongest competition from Continental countries which Dr. Cole (in common with representatives of American industry) contemplates, will be entirely due to the very low scale of Continental wages and living conditions.

Of Dr. Cole's balancing of the advantages and disadvantages of particular types of machinery, it may be said that he is dealing with a subject akin to that of deciding which make of automobile is best. The judgments he reflects are those of individual preferences, or of suitability to particular requirements. They have no more significance than that a Pierce-Arrow is superior to a Ford (or vice versa, according to use and viewpoint). The last word upon this subject is that all types of the foreign machines are accessible to American mills and are extensively used by them, just as the American types are accessible for foreign mills. In either, the selection is determined by particular needs, personal experience, and to some extent personal preference — just as the selection of a make of typewriting machine is determined by special use or individual predilection.

Dr. Cole expresses the unqualified conviction that "the outlook for the future through progressiveness leans distinctly in favor of the foreign industry." It would be interesting to learn in what ways Dr. Cole thinks the foreign industry exhibits the greater progressiveness that makes the outlook for better equipment distinctly in its favor. Other than the slightly earlier beginning in Great Britain of research work through associated effort, his article affords no evidence of a greater progressiveness there. And, as previously noted in our discussion of this British research work, undertaking the researches under a coöperative plan a few months sooner than it is similarly begun in the United States is not indicative of any less interest or smaller achievement in such investigations.

We might diverge here for a moment sufficiently to mention that the reference to "infant industry" in one of Dr. Cole's notes (27) is a more superficial touch than we have a right to expect from a serious student earnestly seeking the facts, as we believe Dr. Cole to be. His allusion implies a belief that the only need for a protective tariff is to develop infant industries. That is one important purpose for which the protective system is employed, and is sometimes needed for very large and lusty infants. The arguments for protection of the American dyestuffs industry rest almost entirely upon the infant industry theory, altho the establishments engaged in that business are among the largest and financially strongest in the country. The factor of labor cost is not the controlling one in determining competitive strength in the marketing of dyes. It is for quite different reasons, and those wholly characteristic of the "infant industry" (irrespective of its size and financial resources) that the domestic dye industry is in need of substantial tariff protection at the present time, and a few years hence it may be altogether independent of the need for any form of protection. But there are other industries which in this country never were in the infant class, and for which arguments applicable in the case of new industries are never advanced. For these the factor of labor cost is controlling in competition; and that factor endures as long as a great discrepancy exists between labor costs in the United States and competing foreign countries. The woolen industry makes no pretensions of infancy. Its representatives have many times said that if American wages are reduced to the European levels, or if all European mills will pay wages as high as those paid in American mills, the woolen industry of the United States will not need so much as a revenue tariff to assure its continuance.

Dr. Cole mentions cloths which, in substantially uniform quality, color and finish, may be procured in this country in any bulk desired, which have filled a wide and fairly constant demand from our consuming public. But the phraseology of the added statement that "the virtual lack of such fabric production in other countries may with such other factors as assurance of delivery, of 'repeat' and credits, account for the alleged disappointment of cloth buyers who in 1913–14, anticipating the new lower tariff, journeyed to Europe and returned without placing any considerable orders," carries an implication of some sort of automatic protection entirely independent of tariff duties.

Mass production of certain kinds of staple goods in the United States has been a coincidental development of the use of ready-made clothing of good quality, and has been possible because of the protective policy having permitted and encouraged that development. The very general use in America of ready-made clothing and a degree of standardization incident thereto are now accomplished facts. The custom will not change, even tho the source of supply does. As comparable with less staple goods made in smaller quantities, the labor cost is slightly less. There are, however, no methods employed in the manufacture of such goods that are not known and in use in European mills; so that if the tariff rates are low enough, the foreign mills can equally well produce goods of this kind in mass and effect a saving in labor cost which would give a similar competitive advantage for such goods as for those made in smaller quantities. It is true that the lower the ratio of labor cost to total cost, the less the competitive advantage; and that, therefore, on kinds of goods that can be made in great quantities there would be slightly less competitive advantage than for those made in ordinary quantities. But the lessening of the competitive advantage held by the foreigner would be small.

Dr. Cole states: "In the case of the finer grades of goods, some net advantage seems to inure to differentiated European industries." The greater individual attention to design, more careful watch over methods of manufacture and finish, essential for goods of the finest quality and newest effects, have not been exclusive characteristics of the mills of other countries. Such specialization has been successful in the United States, but is associated generally with smaller manufacturing units than those in which staple goods are made. Increased labor and care imply higher labor cost, whether in Europe or America. But of course, and conversely to the case of staple goods, which we referred to above, fabrics requiring the greatest labor costs will show the greatest disparity between American and foreign costs (disregarding the raw wool duty and its effects), and will require a somewhat higher rate of protection. As already mentioned in this article, goods of this kind, being in the luxury class, can well carry the higher duty necessary to maintain a completely diversified industry, permitting the training of some of the personnel to the most expert stage, thus stimulating the entire industry to constant improvement.

It is a fair statement that improvement in machinery, in equipment and plant devices, has not been notably different in number or value, in the United States and Europe. Dr. Cole, however, rather undervalues the importance of these improvements in the last sixty years, as compared with those of an earlier period of similar length. If less conspicuous historically, the economic value and far-reaching influence of the later inventions and improvements were no less important than the earlier and cruder projections.

After a great basic invention has been made available and has undergone the important early improvements that grow out of practical experience, it is not usual that a succession of equally fundamental inventions in the same field follow. Therefore what the author has to say of the fact that there has been no fundamental change in recent years in the machinery and equipment of either the woolen or worsted branch of the industry, is equally true of the sewing machine, the reaper, the printing press, the telephone and most of the other great inventions. There are improvements and refinements, but these are not revolutionary in character, or spectacular. However, in the Bradford combing system, in worsted spinning and in automatic weaving, great changes have slowly and constantly been developing.

Dr. Cole is emphatic in his statement that "the leading organizations in the American industry show no interest in the deliberate promotion of research and invention, and our textile journals, presumably following the tastes of their clienteles, devote little space to the matter." But American textile journals will resist the statement that they devote little space to reports of research and invention. An examination of the files of the older publications will, we think, disclose accounts of most of the inventions, domestic and foreign, that seemed to possess any real utility for the industry.

Another aspect of the matter is this. One of the controlling influences which has caused most of the equipment of Bradford combing and spinning to be brought from England has been that at first, and for a considerable subsequent period, the machinery was to a large extent controlled by British patents, which delayed the beginning of the use of that kind of machinery in the United States and gave the British machine builders a long lead which only in more recent years it has been possible to overtake. Another has been the large proportion of managers and workmen in American worsted mills who obtained their training in England and there developed predilections, if not prejudices, in favor of the British-made machines. To some degree the same tendency exists in the case of Continental types of machinery. Managers and workers in American mills who derived their experience in Continental mills, have a tendency to prefer the installation of Continental types of machines in the mills in which they are engaged.

Dr. Cole very much deprecates the existence in this country of competitive bidding for labor, and says that so long as it is continued wages are bound to be maintained frequently at unnecessary heights, and that the only effective remedy is through a better control based upon increased coöperation among American manufacturers. Competitive bidding in the matter of wages does exist in the woolen industry here, and there are many who believe that competition is more favorable to the welfare of the workers than the kind of collective bargaining by entire groups which Dr. Cole seems to approve and to consider an evidence of advancement in executive management.

As a third possible path of advancement for the American woolen industry, Dr. Cole suggests standardized products. Many of those who, from the nature of their industrial responsibilities, have had to give intensive study to the subject of production possibilities, are convinced that further concentration upon standardized manufactures cannot be made successful, and that such concentration has already proceeded further than the tastes or preferences of the public will justify. The most hopeful line of development for American mills of the medium and smaller sizes would rather seem to be that of specialized goods for which individualized repute can be acquired. It is in such fields that the greatest successes have been made by European woolen manufacturers, and in this country a few illustrious examples give promise of similar possibilities. The greatest weakness and the biggest evil of the domestic woolen industry has been the fickle pursuit of ephemeral successes. When one mill seems to have its product more than commonly in demand, the succeeding season finds many others offering similar goods. Constant change in the kinds of goods manufactured entails changes in processes and methods which are unfavorable to the attainment of the highest skill and reputation in any kind.

Summing up his observations, Dr. Cole says:

> The deductions to be drawn from these general conditions of possibility and probability obviously will differ sharply according to one's economic or political faith. For one who views with regret the indefinite maintenance of tariff aid for any industry which shows no real prospect of ultimate self-sufficiency, the situation is discouraging. He cannot recognize in the wool manufacture as valuable a member of the body economic (if one may use the phrase) as the majority of our more important industries. On the other hand, for the protectionist who believes that domestic industries, whatever their competitive strength, should be given the amplest support against the cheaper working foreign manufactures, the details and the exact measurement of the comparative disadvantage in the American wool-using industry are of no consequence. It suffices for him that there is real and apparently permanent disadvantage. And to him the case is conclusive for the continuance of a system of duties on woolen and worsted products substantially like that which has been in force during the last half century.

Here Dr. Cole again overlooks the basic fact, which he has himself fully and abundantly established, that it is not a question of self-sufficiency. Given identical wage costs, American woolen mills will be as seld-sufficient as those of Europe. It is entirely a question of whether American standards of wages and living shall be maintained. As already has been said, there are two ways in which the wage equality can be brought about: by bringing American wage costs down to the low level of those of Europe, or by bringing European wage costs up to the American level. As one of our well-known manufacturers recently wrote to an English correspondent, the former is not only undesirable, but if attempted would meet with a revolution, while the latter would be highly desirable and would meet with no opposition whatever from the workers. Therefore, those who wish to retain in the United States a complete and self-contained wool manufacturing industry without a protective tariff should devote their efforts to bringing the living standards of the European workers up to those of American workers. Those who think the retention of the industry is not of enough importance to warrant tariff rates sufficient to sustain American living standards will prefer the third course that is open: dispensing with the industry and absorbing in other kinds of business all of those now engaged in the woolen industry, or in businesses dependent upon its existence. This implies a satisfaction with two consequences: (1) greater competition for places in the industries in which they are absorbed, with a lowering of wages and salaries therein; (2) less competition in the sale of woolen goods, with eventually increased prices therefor. Dr. Cole does not clearly indicate which of the three courses he thinks best for the national interest; and we think he is not very sure which he ought to advocate. It may, however, be inferred from his article that he is in accord with a dictum of Professor Taussig that "wages in the United States . . . if not caused by the tariff alone, they are at least dependent on it. They are the result of the tariff system in this sense: as they are and where they are, they could not be paid but for that system."

WARREN F. DOANE.

NOTES AND MEMORANDA

THE GENESIS OF MODERN CAPITALISM[1]

Professor Sombart has given us a substantially new book under the guise of a second edition. Only one-tenth of the material of the first edition reappears in this new version of the work, and it is extremely difficult to find this tenth. Published during the war, it failed to receive attention outside of Germany; yet it deserves the careful consideration of economists and historians. Plan, scope, and method have been completely changed: the excessive schematization that marred the previous work has given place to an historical realism that will make the book useful and stimulating to those who disagree with its outstanding positions, and the careful separation of explanation of the categories used from the historical illustrations makes it much easier to vizualize the author's meaning.

Professor Sombart still stands somewhat outside of the main current of academic thought, in Germany no less than in other countries. The consciousness of this measure of isolation obtrudes itself at times, both in his appraisals of the work of other economic historians and in his general remarks about historical literature. One has the sense of a struggle to accomplish something entirely new, and of hopes to impart a new direction to the current of literature on economic history. There is somewhat of the conceit of loneliness in many of the passages, but these ambitions and conceits are by no means without foundation. The discontent is a noble discontent, tho not always gracefully expressed: the ambitions are well conceived and significant progress is made toward their realization in the present version of the work. The first edition stood outside the main current of thought because it was labored and difficult to understand. This present edition stands somewhat apart because it represents genuine progress in the systematic presentation of economic history. The isolation is that of leadership.

---

[1] Sombart, Werner, Der Moderne Kapitalismus, Zweite neugearbeitete Auflage. 2 Bände, pp. xxvi, 919; x, 585; ix, 564 (589–1155). Duncker & Humblot, München & Leipzig, 1916–17.

Altho the essential doctrine of the book is still largely unchanged, thus justifying the use of the old title, the ideas become clearer because it is now possible to understand their relationship to the work of other writers, notably Schmoller, List, and Bücher. The influence of Marx is less apparent, and, if one may draw inferences from the separate work *Socialism and the Social Movement*, the direct influence of Marx reached its climax in the first edition of *Modern Capitalism*. Sombart lays great stress on the presence in the Marxian writings of both revolutionary and evolutionary doctrines. He feels that Marx never worked out the concept of evolution that he gave to economic history, so that one is tempted to regard the earlier version of *Modern Capitalism* as an attempt to give full expression to the thought of Marx. That version is somewhat spoiled for the non-socialistic reader by the constant insistence upon the ultimate emergence of a socialistic society. The reception of the book undoubtedly made a deep impression upon its author, and the present work is an attempt to give concrete expression to a concept of economic evolution in terms of actual historical process rather than in bare abstractions built up from Marxian principles. New influences have come to the fore in this attempt, notably Schmoller and List. Schmoller had always been an important factor in Sombart's thought, but in this work Schmoller becomes the dominant influence. It is the Schmoller of the essay on the mercantile system (1883), too, rather than the Schmoller of the *Grundriss*. This is, of course, especially consistent with the close reading of List now evident and the explicit attempt to carry on the doctrinal tendencies found by Sombart in List's *National System*. The new book is thus closely rooted in the literature of the subject: it attempts new things, but only in the sense of addressing itself to old problems with fresh vigor.

The present work is designed to afford a comprehensive view of the evolution of economic life in Europe as a whole since the great revival of the eleventh century. The earlier period is sketched rapidly, but with genuine insight and commanding power of generalization. The narrative increases in compass after the mid-fifteenth century. The two volumes thus far published carry the development down to the beginning of the nineteenth century, leaving the conclusion to a subsequent volume or volumes. Sombart's book on Germany in the nineteenth century (*Die Deutsche Volkswirtschaft im Neunzehnten Jahrhundert*, 1903) affords some insight into the character of the continuing volumes that may be expected. Originally written soon after the completion of the first edition of *Modern Capitalism*, it was intended to embody the essential principles of that work. But Sombart's thought underwent many changes in the course of study of recent conditions, and it is possible that these departures were the beginning of the project now in process of execution on so large a scale. At all events the books should be read together until the special work on Germany is supplanted by the final volume of the new version of *Modern Capitalism*.

The underlying unity of the economic life of Europe is presented by Sombart with more conviction than has yet been shown by any writer of the first importance, and this feature of the book is one of its most important claims upon our attention. Sombart complains with justice of the unfortunate influence of nationalistic limitations upon the work of Levasseur, Cunningham, and Inama-Sternegg. He feels that these scholars have failed in many instances to distinguish properly between constitutional and economic history, and that they have neglected the genuinely economic phenomena. The history of the towns affords the most striking illustration of the difference in point of view. Sombart wishes also to emancipate economic history entirely from the misleading implications of the designations of periods that have become customary in the treatment of political and constitutional history. He therefore suggests a series of terms built around the concept of capitalism: the pre-capitalistic period, (*a*) domestic economy, (*b*) craft economy; the early capitalistic period; the dominantly capitalistic period.

The beginnings of the early capitalistic period are assigned in the stricter sense to the mid-thirteenth century, on the ground of the dealings of the Sienese merchants with Papal funds and revenues. Capitalistic modes of trading and capitalistic organization of industry appear in various towns of Italy, Germany, and the Low Countries, but this does not seem to warrant characterization of the period as the first stage in the development of capitalism. The important beginnings of capitalism appear in the latter half of the fifteenth century as the result of the following factors: the discovery of new gold and silver mines in central Europe; the discoveries of America and of the sea route to India; the religious persecutions; the entry of the Germanic peoples into history (*sic*); the completion of the development of the feudal monarchies; the rise of the modern army; advances in industrial technique; perfection of double entry bookkeeping. The formative period of the capitalistic order is presumed to continue until the mid-eighteenth century in England and until the mid-nineteenth century for Europe as a whole.

Sombart is fully justified in the feeling that his term "early capitalistic period" is superior to Schmoller's term, territorial economy, or to Marx's term, the period of manufacture. At the same time, it is not so clear that much is gained as against a series of terms that would be more closely related to political and constitutional history: the medieval period; the early modern period; the modern period. As a basis for the comprehensive treatment of economic history the categories of capitalism are by no means wholly satisfactory. Agrarian problems are not clearly placed. From the social and economic points of view they are at least of coördinate importance with industrial and commercial problems, but in the suggested scheme they are made to appear incidental and unimportant. The colorless designation of the periods in terms of the time sequence alone does not prejudice any of the problems of interpretation, tho the intervals are distinguished sufficiently for all purposes.

It is, of course, desirable that the presentation of economic history should not be dominated by political and constitutional history, but one must recognize that the relations between these different aspects of social life are so close that there are inevitably genuine correlations among the datings of the major periods. All the lines of demarcation emphasized by Sombart are important in political and constitutional history. Periods of active economic growth and change are inevitably periods of constitutional growth, and political changes are a frequent accompaniment. The emancipation of economic history from undue influence will be accomplished rather by emphasis upon the economic content of the periods than by the use of obtrusively economic terms in characterization. Sombart seems to attribute excessive importance to the naming of the periods.

The stages in the genesis of capitalism are concisely sketched in a notable introductory passage. "I have said," he says, "in one place ' in the beginning is the army ' meaning that I see in the modern army the first and most important tool that was formed by this new spirit to accomplish its work. By means of the army was the state created, that first completed manifestation of the new spirit, in which and through which it becomes a power. In order to attain mastery over nature it then seeks to transform technique, and its deep-seated longing for money and power leads it to the deposits of the precious metals which it exploits. These three domains appear as independent fields of activity for the new spirit, it is never lead away from one by its interests in the others" (I, p. 331).... "State, technique, and production of the precious metals are the basis of capitalistic development. . . . The state, by its army, creates a great market for capitalism and fills economic life with the spirit of discipline and order.... Technique makes production and transport on a large scale, first possible, then necessary. . . . The precious metals influence economic life in many ways: they transform the market in a direction essential to the development of capitalism; they heighten the capitalistic spirit by strengthening the desire for gain and perfecting the means of expressing values" (I, p. 332). Then follow in sequence: the development of a wealthy bourgeoisie; changes in consumption; the creation of new productive powers; the capitalistic undertaking. "The demonstration of all this in detail is the aim of the present work" (I, p. 333).

This brief formulation of the thesis of the book brings out clearly a number of essential traits: the emphasis upon the creative power of the state; the conception of capitalism as a spirit or as a manifestation of the will or ingenuity of the people; the attribution of critical importance to the army, to the hoards of precious metals, and to the commercial policies of the state. These ideas are obviously unrelated to the body of classical economic theory and the principles derived from it. The detailed account of all these matters in no wise diminishes the antithesis between Sombart's doctrine and those of the classical school. He is clearly conscious of the difference in view, and it is in this sense that he seems most definitely to continue the work that Schmoller unfortunately began in 1883. Sombart challenges the adequacy of classical thought in the same spirit, tho he recognizes the essential interdependence of history and theory. His position is thus somewhat different from that originally taken by Schmoller, but it is undoubtedly an outgrowth of Schmoller's work. The larger significance of Sombart's book lies in this sharp formulation of the divergent tendencies in economic thought. He leaves us a new dilemma; an antithesis between a liberal system and a restrictive system. These systems of thought must needs involve close interweaving of both theory and history. Sombart presents us with the detail of the interpretation of history based upon the restrictive theory, and indicates the fundamental positions of theory involved. The work of Sombart shows by contrast one element of weakness in the system of liberal thought: it has no systematic body of historical interpretation. The historians who have been in sympathy with such views have paid little attention to the systematic problems that are of fundamental importance in the new polemic that is so strikingly foreshadowed by Sombart.

In developing the antithesis between his thought and that of the classical school, Sombart recognizes his obligations to the mercantilists. His displays much resentment at the disposition of the classicists to treat them as forerunners of Adam Smith and the physiocrats, contending that they represent distinct systems of thought which have as yet failed of complete expression. He identifies himself with them and says that he will doubtless be classified as a neo-mercantilist. He cites List, Dühring, and Carey as writers who did much to win for mercantilism its true independence. Lest there be any doubt of his meaning we have both a long, balanced antithesis between classical and mercantilistic thought, and a sketch of a mercantilistic system of political economy.

The classic system he deems to be (1) mechanical; (2) individualistic, picturing a society that is dominated by circulation problems — value, price, and exchange; (3) static. The mercantilistic system is (1) organic, dealing with a society conceived as a whole; (2) collectivistic, emphasizing the problem of organized production; (3) dynamic, dealing with a process rather than a condition (II, pp. 915–920). In the detail of this long antithesis there is much that is questionable, especially in regard to the interpretation of the classical economists. Some distinctions and contrasts are certainly overdrawn. But the significant fact is not so much the accuracy of the antithesis as the setting up of this contrast in doctrine. The concluding passage runs as follows. "We will first rightly appreciate the diverse tendencies in economic thought when we accustom ourselves to distinguish two systems of doctrine: the one a mechanistic and static exchange theory, the other an organic and dynamic production theory; one regarding economic life as a condition, the other interpreting economic phenomena in terms of process. . . . The scientific thought originating in the work of the classical school should be called 'Social Economics' to indicate that it has as its subject matter the relations within a stateless society of individuals. One should not on account of this science, or rather this mode of interpreting social life, forget the other contrasted view — the science of the origins of the wealth of nations, called by List the theory of productive powers. . . . This view may well be designated by the old term 'Political Economy'" (II, p. 920).

There follows a sketch of the essential features of mercantilistic thought under the title "The doctrines of a mercantilistic system of economics." There is first a group of political ideas: the preoccupation with the interest of the state as a whole; a presumption that the power and independence of the state is the supreme concern; recognition that population is the ultimate source of power; the interpretation of the economic life of the state as a functional activity, controlled by the state for its ends. Second is a group of economic ideas: the concept of social productivity, stated by List inadequately and thus in need of further elaboration; the increase of national wealth by the stimulation of maximum production within the country and by advantageous foreign trade; the discovery of capitalism. Both of these last points involve much that is novel. The handling of the problem of foreign trade is quite fresh, but too complex to admit of successful statement in brief compass. The notion of a "discovery" of capitalism is in itself indicative of the novelty of the treatment of that subject. The thesis of the section is that Marx discovered capitalism for science, but that the practical discovery was the work of the mercantilists. They become, therefore, in Sombart's interpretation the driving force behind the whole development of the period, and the formula used by Schmoller in 1883 that mercantilism is state building thus receives a significant extension of meaning in Sombart's present work. The doctrinal positions stated in these passages, too, dominate the whole book, for Sombart shows unusual power in forming the historical material to these patterns. Regardless of one's opinion of the theory, the quality of the artistic accomplishment commands admiration.

The interpretation of economic development in this work is, therefore, diametrically opposed at every important point to the thought that has dominated the social sciences in

France, England, and the United States. Systematic writing in economic history has long been influenced obscurely by doctrinal positions that diverge from the liberal thought: through contacts with socialistic thought, in the work of Bücher and Hobson; through contacts with mercantilism in the case of Schmoller. Unfortunately, the theoretical implications of these interpretations of economic history were not clearly enough revealed adequately to challenge the attention of writers in France, England, and the United States. It would seem that there could no longer be any doubt of the need of meeting the challenge so vigorously made by this commanding work of Sombart. Historians who are in sympathy with the liberal economic doctrine cannot afford to leave the writing of systematic treatises to authors whose premises are fundamentally different. It is impossible to use in elementary instruction generalizations that are not consistent with our own thought, and even if we find realistic methods most useful in monographic work and in general presentation of historical material we must recognize the need of systematic interpretation in class work and in texts. It is the belief of the writer that there is no fundamental position of Sombart that cannot be significantly challenged from the liberal point of view. The development of the period can be presented in terms that are as definitely consistent with the classical theory as Sombart's interpretation is inconsistent with those views. The relative validity of the two points of view must turn primarily upon the quality of the analysis in the domain of pure theory.

It is obviously impossible to present here a detailed criticism of Sombart's interpretation. It must suffice to comment briefly upon the fundamental issue between the two schools of thought. The mercantilistic system presumes that the destiny of the state and the economic welfare of society rests primarily with the rulers and the people; a little more largely with the rulers than with the people, but depending primarily upon these human factors and only secondarily upon environmental factors. The doctrine is an application of the principles of the freedom of the will. These features of the system of thought appear very clearly in Sombart, both in *Modern Capitalism* and in the *Economic Development of Germany in the Nineteenth Century*. The liberal doctrine is after all a theory of qualified determinism; an analysis of social growth in which the form and structure of social life are presumed to be the result of progressive adaptations to the environment, subject to natural laws and capable of rational explanation because the phenomena are the orderly manifestations of an evolutionary process.

It is difficult to feel that Sombart is consistent in his treatment of this issue. His formal statements are all frankly mercantilistic: the controlling factors are the will of the state and the quality of the people. Capitalism is said to be the invention of the Italians, carried to fuller perfection by the northern races because of the superior endowment of those peoples in connection with the demands of the capitalistic system.[1] Mercantilism creates both the state and the system of modern capitalism. But natural resources are recognized as controlling factors in many features of economic growth, so that one is sorely puzzled by the relative importance of what is "primary" and what is "secondary." The "secondary" factors seem to dominate conditions at crucial points. To one of the opposite faith, these passages are a clear index of the validity of the liberal position. The mercantilist position is weakened, if not destroyed, by the inconsistency between its principles and the detail of its analysis.

The concept of evolution is also involved in this issue between free will and qualified determinism. It is difficult to reconcile the conception of freedom of the will with an evolutionary process: either the will loses its freedom and itself becomes conditioned by circumstance, or there is merely a sucession of capricious events that cannot with propriety be termed an evolutionary process. Sombart's work illustrates this difficulty to perfection. It is a presentation of sequences of events, but the series of happenings bears little relationship to any evolutionary process in the sense that the term has come to possess at the hands of the biologists. The driving force in Sombart's scheme comes from the outside: we think of evolution rather as a process that is an expression of inner necessity.

---

[1] Deutsche Volkswirtschaft im 19 Jahrhundert, pp. 116–127.

The compass of the present paper prohibits any adequate discussion of the many items and chapters that are not deeply involved in the larger matters of principle. The sketch of the rise of the towns, most of the discussion of the production and distribution of the precious metals, much of the discussion of craftsmanship, will prove stimulating and useful to all who are concerned with the history of the period. These passages are a permanent contribution to the literature of the subject. The work should, therefore, bring to its author generous recognition from all sides, whether he is regarded as a brilliant advocate of the "true" doctrine, or as one of the most talented antagonists of liberal thought.

ABBOTT PAYSON USHER.

BOSTON UNIVERSITY.

INDEX NUMBERS OF FOREIGN EXCHANGE

INTERPRETATION has always lagged far behind the collection of statistical data, altho nothing conduces so much to effective collection as a clear appreciation of the significance of the data to be collected. Recently the knowledge of elementary statistical devices has spread rapidly without a corresponding extension of the more exacting art of interpretation. Hence one finds numerous instances of laborious effort expended upon the elaboration of averages, index numbers, and coefficients, where more careful preliminary consideration of the results would have indicated the futility of applying refined methods to such material or the necessity of employing a quite different procedure. Moreover, so uncritical are most readers in their acceptance of statistics, that figures well-nigh meaningless, or misleading if made the basis of inferences, are given wide recognition and currency without being interpreted by their authors or any one else. Such practices tend to encourage the superficially minded in a kind of knowing ignorance, and to discredit statistical methods among thoughtful laymen.

A pertinent instance of these tendencies, the writer believes, is afforded by the current index numbers of foreign exchange. Early in 1921 several European journals — the London *Statist*, the *Frankfurter Zeitung*, the Norwegian *Farmand*, and the Swedish official *Kommersiella Meddelanden* — published computations of index numbers of their respective exchanges. In July, 1921, the *Federal Reserve Bulletin* set forth, with admirable lucidity and completeness, these various indexes and the methods used in their calculation; and gave its endorsement to the idea by working out a foreign exchange index for the United States, which it presents month by month in table and chart form.

The nature of these indexes is easily understood. Each is an average of exchange rates quoted at a given center, on the leading countries with which the first country has trade relations; quoted rates on each center first being expressed as percentages of pre-war gold parity, and then (in most instances) weighted according to the volume of trade with each of these countries. The variations in method relate chiefly to the number of exchange rates utilized, the type of average (arithmetic or geometric) employed, and the determination of weights.

Alternatively, the index numbers may be expressed, as the British index uniformly is expressed, as the average "exchange value" of the national currency abroad, this being at a premium when the average foreign exchange is at a discount, and vice versa.

Those interested in the methods of calculation will be abundantly satisfied, but those who, like the present writer, are interested rather in the meaning and utilization of the indexes will find strangely little aid either in the *Federal Reserve Bulletin* article or in the periodicals which gave birth to this new species of index. In broad terms, indeed, the expectations are mentioned. Thus, the *Statist* asserts that "the index numbers represent the collective value of the £ abroad expressed as a percentage of its collective value at the old parities in terms of the foreign currencies," and expresses the hope "that this index number will add to the statistical information at the disposal of our readers by enabling them to discern the general trend of the value of our currency abroad amidst the multitude of daily exchange fluctuations."[1] Similarly the *Federal Reserve Bulletin* refers to the index numbers as "measuring the general trend in exchange values of foreign currencies," as "indicating the direction and amount of movement in their respective national currencies as related to the collective currencies of other countries," as assisting in "ascertaining the general position abroad of the currency of a country" — so difficult "in the midst of the daily fluctuations and disturbances ruling in the exchange market." "Studied in conjunction with the index numbers for wholesale prices of commodities the index of foreign exchange rates affords comparison of the changes which occur both in the internal and external value of a country's *currency and gives a perspective* of its purchasing power both at home and abroad." It is asserted that, despite admitted limitations, "the index numbers, nevertheless, are useful and of interest in analyzing the effects of the present deflation process on the purchasing power of currencies abroad."[2]

Unfortunately, many of these expressions are themselves vague, and the *Statist* has ventured rarely and slightly,[3] and the *Federal Reserve Bulletin* not at all, to draw the inferences and elucidate the conclusions to which a study of the course of the index might be supposed to lead.[4] Publications quoting the indexes have been equally silent. Yet few readers are competent to attempt this task of interpretation without considerable guidance and assistance.

---

[1] Statist, March 5, 1921, pp. 382, 383.

[2] Federal Reserve Bulletin, July, 1921, pp. 794–796.

[3] Statist, May 14, 1921, p. 816; Dec. 12, 1921, pp. 888, 889.

[4] Last August the writer offered the suggestion, to the editors of the Bulletin, that space be given to interpreting the index for the United States; but the brief comment which accompanies the monthly chart hardly supplies the want.

The present writer, after making this attempt, cannot escape the conclusion that the new index numbers add nothing to our knowledge, are theoretically unsound, and tend to be misleading rather than helpful. If this be so, the whole series of puzzling questions as to what weights to use, how often to adjust them, how to allow for factors other than recorded trade, whether to use the geometric or the arithmetic average, and so on, are superfluous. If, on the contrary, the index numbers are soundly constructed and of practical utility in spite of technical deficiencies, their proponents should interpret them to casual or skeptical readers.

The practical utility of the foreign exchange index may first be questioned. The business man is primarily interested in prices of particular commodities which he buys or sells, at home or abroad. He is concerned with particular exchange rates, and their tendency over a period, because they affect his actual outlays or receipts, and his potential market or source of supply. The exceptional business man further interests himself in the course of the level of commodity prices in general, at home and perhaps also in certain countries abroad, principally as they indicate the stage of business prosperity or depression, or suggest, in connection with other facts, possible forthcoming events. But what use can he make of an average of the wholesale price indices of a number of countries, or with an average of foreign exchange quotations, in which the particular facts which concern him are submerged and obscured, while the significance of the averages is not revealed?

To the economist, no less, the utility of the indexes is doubtful. All will sympathize with the desire to find some significant figures which will be easier of comprehension and utilization than the multitude of daily quotations. Here lies the advantage of selecting one rate, out of the many quoted during a day, at one given center on another, as typical for that day (e. g., the noon buying cable rate), and of computing weekly or monthly averages of these typical rates, which have been a very useful by-product of the computation of the index numbers. These enable one readily to distinguish the general course, day by day and month by month, of a given exchange rate. It is the next step in the computation, the combining of a number of monthly average rates on several centers, that is of doubtful value and validity. Is this more useful than taking, by an elaborate photographic process, a series of composite pictures of the commodities landed each month at the port of New York? Can one correctly speak of the "collective value" of a currency abroad, or of a general trend, in exchange values of foreign currencies? These questions raise certain theoretical considerations.

The phrase "collective value of our currency abroad" implies a purchasing power over *commodities* abroad. But the index number certainly gives no accurate indication of changes in such purchasing power. Because the *Federal Reserve Bulletin* index in a certain month is 50 (with 1913 as 100), it cannot be inferred that a dollar will buy twice as much in foreign commodities as it bought in 1913. It is nearly as dangerous to draw such inferences from changes from month to month or from year to year. Even an individual exchange rate gives no reliable indication of purchasing power over commodities, in a single foreign country, for changes in price levels are constantly taking place. Broadly speaking, price changes, subject to a certain lag, tend to offset more or less completely the influence of changes in exchange rates. But the experience of recent years shows how dangerous it is to generalize about the relation between price changes and exchange fluctuations. The "disaccord" between prices and exchange rates has been a particularly marked phenomenon in the extraordinary currency events since the war.

No, the index numbers merely indicate a kind of average purchasing power over foreign currencies, which in turn are used, at various price levels, to procure goods, services or securities. To get at a "collective value" of a currency abroad, it would be necessary to go a step further — to utilise the index number of foreign exchange in conjunction with a corresponding average of price levels in different countries, much as to get the purchasing power of a dollar over a single commodity abroad, one must multiply the foreign price of that commodity by the exchange rate. While such a procedure might in theory be defended, the lack of comparable index numbers for the various countries of interest would vitiate the effort, even if the attempt was not rendered useless by the remoteness from reality in the figures to be obtained.

But is it not an average purchasing power merely over foreign *currencies* significant? This is extremely doubtful. Currencies are valued only as a medium of exchange. An average which submerges their significance as power in exchange over commodities obscures their very *raison d'être.* More important still, it must be emphasized that in these days, with the well-nigh universal suspension of the gold standard, each foreign currency is a unique commodity in a sense which was quite untrue when all bore a fixed relation to gold, a common standard. Pre-war parities, as Professor Cassel rightly insists, are for the present of historical interest only, except as they are a convenient base for expression of current exchange rates and a possible ideal for future attainment. These unique commodities are subject to innumerable influences — some purely domestic, some common to a few nations, a few common to all, which affect their respective values without being subject to the limiting factors which exist when gold redemption is practiced and gold movements are freely permitted, or to limits comparable to those which operate upon the several commodity prices which make up the price level of a single country. Exchange rates today are essentially unhomogeneous commodities which cannot safely be averaged.

No one has yet attempted to get an average weight of animals by averaging the weights of an elephant, a steer, a dog, a mouse, and a flea, even with an elaborate system of weighting based upon the number of each estimated to be in existence or by extending the list of animals so as to be fully representative. Even the *Frankfurter Zeitung*, with its remarkable zeal for index numbers, has not yet attempted to get an average price in marks of American brick, Swiss mountain scenery, Belgian university training, and British mine labor. The foreign exchange index numbers, while apparently less grotesque, are hardly sounder in theory and hardly more illuminating. There is the nearest approach to justification, perhaps, for the American index number, which reflects an average gold value of the heterogeneous foreign currencies. The foreign index numbers have the further defect that the very unit unemployed for measurement varies even more capriciously than the value of gold — as if, in the first illustration above, one made measurements at monthly intervals with a kilogram itself of varying weight. But even the American index number seems to defy interpretation because quantities essentially unhomogeneous are combined into a weighted average.

The *Statist* believes that the rise in its British index number from February, 1920 to March, 1921 indicated "the effects of the deflation campaign on the purchasing power of the pound sterling, both at home and abroad." [5] Now, the British *price* index numbers indicate *among other things* the effect of the deflation on the domestic purchasing power of the pound, and this they do more adequately than could any foreign exchange index. As to the purchasing power abroad, the exchange index alone, as we have seen, gives no indication of purchasing power over foreign commodities. It is true that the British index number is in part determined by currency and credit policies at home and abroad, but these influences partially offset one another and many other factors also operate upon it. The resultant of so many interacting and often counterbalancing forces cannot be said to give any clear indication of the effects of certain forces among the many.

If one really wishes to discern the trend of foreign exchange as viewed from a particular center, a clear picture in small space may easily be obtained by plotting, on a logarithmic or ratio scale, the monthly average rates on various centers expressed for convenience in percentages of pre-war parity. On such a chart the relative changes stand out clearly, enabling one to distinguish the significant variations from country to country and to group the countries according to common tendencies. Such a chart or charts will serve most of the purposes for which the index of foreign exchange has been designed without being open to the criticism which it deserves. For example, they reveal, far more clearly than the index numbers, significant seasonal movements in the exchanges.

---

[5] The British index number, as noted above, is designed to express directly the purchasing power of the pound sterling over foreign currencies. Hence it rises when exchanges move in favor of London.

The objection to the elaboration of such index numbers is not alone to the waste of labor which they entail in preparation and in amateur efforts at interpretation, and to the discredit which they reflect upon useful statistical devices, but to the unsound reactions they imply or support. For example, the index numbers of foreign exchange attach an unwarranted significance to pre-war parities, which are already all too highly regarded. They imply that foreign currencies are really of a common species, whereas they are today widely diverse species. They lend support to the widespread delusion that foreign currencies had *equal* purchasing power under pre-war (normal) exchange rates and have an abnormally *high* purchasing power over commodities in countries with depreciated exchanges. These are subtle dangers, fortunately less serious because so few take the trouble to draw any inferences whatever from the computed indices.

J. S. DAVIS.

STANFORD UNIVERSITY.

BOOKS RECEIVED

Alzona, Encarnación. Some French Contemporary Opinions of the Russian Revolution of 1905. New York: Longmans, Green & Co. 1921. pp. 117. (Columbia University Studies.)

Angas, L. L. B. Reparations, Trade, and Foreign Exchange. London: P. S. King & Son. 1922. pp. 351. 12*s*. 6*d*.

Beman, Lamar T. Current Problems in Taxation. New York: H. W. Wilson Co. 1921. pp. 350. $2.25.

Burns, C. Delisle. Government and Industry. New York: Oxford University Press. 1921. pp. 315.

Carnegie Endowment for International Peace. The Proceedings of the Hague Peace Conference. Translation of the Official Texts. New York: Oxford University Press. 1921. pp. 272. (The Conference of 1899 and 1907. Index Volume.)

David, Donald Kirk. Retail Store Management Problems. New York: A. W. Shaw Co. 1922. pp. 1050.

Dixon, Frank Haigh. Railroads and Government. New York: Charles Scribner's Sons. 1922. pp. 384. $2.25.

Douglas, Paul and Dorothy, and Joslyn, Carl S. What Can a Man Afford? Princeton, N. J.: American Economic Association. 1921. pp. 118. $1.00. (Two esssays awarded the Karelsen Prize.)

Fassett, Charles M. Assets of the Ideal City. New York: Thomas Y. Crowell Co. 1922. pp. 177. $1.50.

——— Handbook of Municipal Government. New York: Thomas Y. Crowell Co. 1922. pp. 192. $1.50.

Farnham, Dwight T. America *vs.* Europe in Industry. New York: Ronald Press. 1921. pp. 491. $4.00.

Folwell, William Watts. A History of Minnesota. St. Paul: Minnesota Historical Society. 1921. pp. 533. (Vol. I.)

Gabriel, Ralph Henry. The Evolution of Long Island. New Haven: Yale University Press. 1921. pp. 194. $2.50.

Giddings, Franklin H. Studies in the Theory of Human Society. New York: Macmillan. 1922. pp. 308.

Gilchrist, R. N. Conciliation and Arbitration. Calcutta: Superintendent Government Printing, India. 1922. pp. 237. (Bulletins of Indian Industries and Labour, No. 23.)

Heymann, Hans. Die Welt- Kredit- und Finanzreform. Berlin: Ernst Rowohlt. 1921. pp. 141.

Hourwich, Isaac A. Immigration and Labor. New York: B. W. Huebsch, Inc. 1922. pp. 574. $6.00. (Second edition revised.)

Keynes, John Maynard. A Revision of the Treaty. New York: Harcourt, Brace & Co. 1922. pp. 242. $2.00.

Kimball, Everett. State and Municipal Government in the United States. Boston: Ginn & Co. 1922. pp. 581. $3.00.

Landau-Aldanov, M. A. Lenin. New York: E. P. Dutton & Co. 1922. pp. 241. $3.00. (Authorized translation from the French.)

Leacock, Stephen. Elements of Political Science. Boston: Houghton Mifflin Co. 1921. pp. 415. $2.25.

Lever, E. A. A Primer of Taxation. Westminster: P. S. King & Son. 1922. pp. 107. 2*s*. 6*d*.

Lewisohn, Sam A. and Moon, Parker Thomas (editors). Constructive Experiments in Industrial Coöperation Between Employers and

Employees. New York: The Academy of Political Science. 1922. pp. 256.

Lippmann, Walter. Public Opinion. New York: Harcourt, Brace & Co. 1922. pp. 427.

Manes, Alfred. Versicherungsweesen. I. Band: Allgemeine Versicherungslehre. II. Band: Besondere Versicherungslehre. Leipzig: Teubner. 1922.

McKinney, James, and Simons, A. M. Success through Vocational Guidance. Chicago: American School. 1922. pp. 270. $2.00.

Moeller, Hero. Die sozialökonomische Kategorie des Wertes. Leipzig: Franz Deuticke. 1922. pp. 100. 25*m*.

National Conference of Social Work. Proceedings of the National Conference of Social Work at the Forty-eighth Annual Session. Chicago: University of Chicago Press. 1921. pp. 526. $3.00.

National Industrial Conference Board. The Unemployment Problem. New York: The Century Co. 1921. pp. 91. $1.00. (Research Report No. 43.)

National Industrial Conference Board. Changes in the Cost of Living. New York: The Century Co. 1921. pp. 30. 75 cents. (Research Report No. 44.)

Ogawa, Gotaro. Conscription System in Japan. New York: Oxford University Press. 1921. pp. 245.

Penson, Sir T. H. The Economics of Everyday Life. (Part II.) Cambridge: Cambridge University Press. 1921. pp. 111.

Picard, Roger. Le Contrôle ouvrier sur la gestion des entreprises. Paris: Marcel Rivière. 1922. pp. 283.

Reinsch, Paul S. Secret Diplomacy. How far can it be Eliminated? New York: Harcourt, Brace & Co. 1922. pp. 231. $2.00.

Richmond, Mary E. What is Social Case Work? New York: Russell Sage Foundation. 1922. pp. 268. $1.00.

Sadler, Gilbert T. The Social Expression of the Spiritual Life. London: C. W. Daniel, Ltd. 1921. pp. 119. 3*s*. 6*d*.

Scrugham, Mary. The Peaceable Americans of 1860–61. New York: Longmans, Green & Co. 1921. pp. 125. $1.50. (Columbia University Studies.)

Seligman, E. R. A. Currency Inflation and Public Debts. New York: The Equitable Trust Co. 1921. pp. 86.

Simiand, François. Statistique et Expérience. Paris: Marcel Rivière. 1922. pp. 61. 3*fr*. 55.

Stockton, Frank T. The International Molders Union of North America. Baltimore: Johns Hopkins Press. 1921. pp. 222. $1.50. (Johns Hopkins University Studies.)

Turgeon, Charles. Critique du Matérialisme Historique. Rennes: Plihon et Hommay. 1920. (In Travaux Juridiques et Économiques de l'Université de Rennes.)

Vanderlip, Frank A. What Next in Europe? New York: Harcourt, Brace & Co. 1922. pp. 308. $2.00.

Von Koch, Fabian M. On the Theories of Free Trade and Protection. London: P. S. King & Son. 1922. pp. 34. 1*s*.

Watkins, G. P. Electrical Rates. New York: D. Van Nostrand Co. 1921. pp. 228.

Webb, Sidney and Beatrice. The Consumers' Co-operative Movement. New York: Longmans, Green & Co. 1921. pp. 504. $6.50.

Westerfield, R. B. Banking Principles and Practice. New York: Ronald Press. 1921. $12.00. (In five volumes.)

Williams, James Mickel. The Foundations of Social Science. New York: Alfred A. Knopf. 1920. pp. 494. $6.00.

THE
QUARTERLY JOURNAL
OF
ECONOMICS

AUGUST, 1922

LAND VALUES IN NEW YORK CITY[1]

SUMMARY

Introductory. Method of study, 545. — I. Vacant land in the borough of Manhattan. Description of parcels. Gross and net increments and decrements, 548. — II. Washington Heights. Tract sold at auction in 1891. Gross and net increments. Early history of tract. Comparison with similar tract in the Bronx, 558. — III. Auction sales. Description of tracts. Losses to purchasers of Bronx lots, 562. — IV. New York City by boroughs. Method of establishing value in 1906 and 1921. Gross and net increments or decrements. Queens borough by wards. Separate tract in South Brooklyn. Increases in land values during nineteenth century. The tax rate and economic rent, 569. — Conclusions, 579.

In all the literature of land values and of economic rent there is surprisingly little in the way of concrete statistical data. Where reforms in land tenure and taxation have been advocated such figures as have been presented have often been loosely used without any thorogoing analysis of their significance. Even the fundamental economic theories in regard to land and rent have never been adequately checked by modern statistical methods. This situation is due largely to the great difficulty in obtaining satisfactory statistical material. Assessors' valuations, until very recently at least, have been entirely untrustworthy, and when in the sale of land the consideration is stated, it is difficult to determine the value of the land as distinguished from the value of buildings and other improvements.

---

[1] This study was prepared under the direction and with the advice of a committee consisting of Alexander M. Bing, Richard S. Childs, Clarence Stein, Robert D. Kohn, Lawson Purdy, Frederick L. Ackerman, Robert Murray Haig, Graham R. Taylor, Robert E. Simon, Herbert S. Swann, and C. H. Whitaker.

It was with the desire of supplying some trustworthy data on which reliable conclusions could be based that an investigation was begun which resulted in this study. The figures presented were compiled from the original records and published reports of the New York Tax Department or from other original and trustworthy sources. It is obviously impossible, within a limited time, to make such a study at all exhaustive, and many similar investigations in New York, as well as in other cities, will be necessary before a sufficient body of statistical material is accumulated for an adequate consideration of all the disputed questions in regard to land values, rent and land taxation. It will appear, however, from the figures here presented that some facts and general conclusions are indicated even by so brief a study as this.

The investigation was started without any very definite plan and without complete knowledge as to the extent or availability of the material. This paper is, therefore, simply a record and brief analysis of the facts which came to light in the course of the work. These facts fall naturally into four general divisions: first, the results of an intensive study of nine vacant or nearly vacant parcels of land in the developed sections of the borough of Manhattan; second, an intensive study of a tract of about fourteen blocks on Washington Heights together with a large acreage tract in the upper Bronx; third, a study of ten tracts which were subdivided and sold at auction between the years 1905 and 1913; fourth, a less detailed study of each of the five boroughs of New York City from 1906 to 1921, with additional data in regard to the five wards in the borough of Queens, and a tract of 24 square miles in Brooklyn.

The tracts and parcels to be studied were chosen on account of the availability of data pertaining to their value without regard to the probable balance of gain or loss to the owners. Each tract was traced back as far as possible consistent with a fair degree of accuracy to some year in which a reasonably accurate estimate of value could be made. From that year the assessed valuations were traced through the year 1921 and the taxes computed for each year. The amounts paid in special assessments were obtained by searching the original records in the Bureau of Assessments and Arrears of the New York City Tax Department. Interest compounded annually at 4 per cent was computed on the base value through the year 1921 and also on all items of taxes and assessments from the date they became due through 1921. Whenever any part of a tract or parcel was improved by building, it was assumed that the income from the improvement would cover the taxes and interest items on the parcel improved. Taxes and interest, therefore, were computed only on the value of the vacant portions of the tract. Special assessments, however, were included regardless of improvement, since these may be considered in the nature of capital charges, a payment to the city for additional value directly added to the property. The question of the actual net return to the owner on improved properties was not considered of importance in connection with this study, since the erection and management of buildings is a business in itself in which the rate of net profit bears no necessary relationship to the value of the land used. It may be noted, however, that in the opinion of business men, real estate investments, averaging the good with the bad, yield no more than a moderate return. Four per cent was used as the rate of interest on the assumption that this rate could have been obtained at any time by conservative investments or savings bank deposits. Since the propriety of including any interest charges at all as a part of the carrying charges may be questioned, these items are always separated from the other charges in the tables and in the text. Whether or not interest should be considered in connection with the social aspects of the problem, it must be considered in an estimate of the profit or loss of the land speculator.

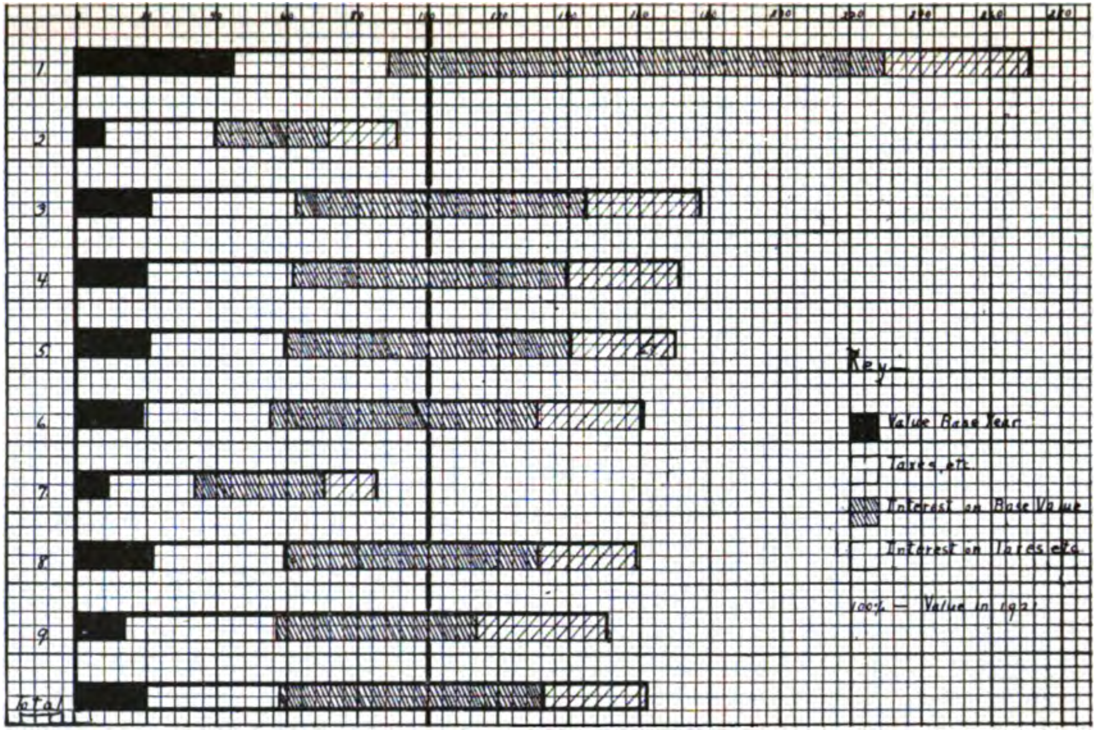
In the following pages the four main divisions of the study as outlined above will be considered in separate sections.

I

Vacant Land in the Borough of Manhattan

While each of the nine parcels covered in this section shared in the general increase in land values due to the growth of the city and the nation in population and wealth, the rate of increase in different sections has varied widely. It is, therefore, necessary first to consider briefly the location and history of these parcels in order to understand the local conditions which have influenced their development.

1. Fourteenth Street. The first of these parcels to assume its present form is located on Fourteenth Street, beginning 200 feet west of Fifth Avenue. It consists of fifteen city lots with a total frontage of 225 feet on Fourteenth Street and 150 feet on Fifteenth Street. The only improvements are a four-story stone residence and a brick stable. These buildings were erected in 1853 and replaced two

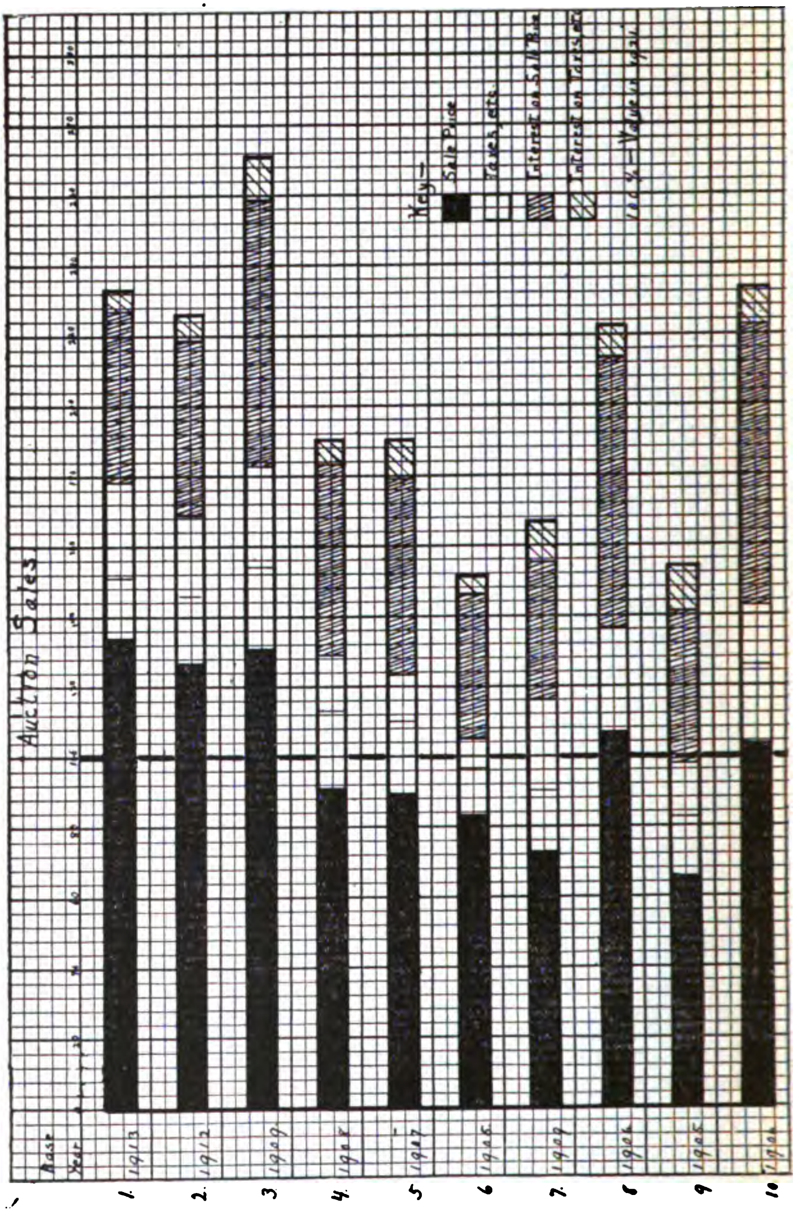


VACANT LAND — MANHATTAN, 1880–1921

older houses which appeared on the tax records from 1840 to 1853. This tract was a part of a large estate and there is no record of its transfer except by inheritance since 1788. It appears as a separate tract on the tax records in 1840 in which year the land alone was valued for taxation at $28,500. Since vacant land at that time was assessed at less than 50 per cent of it's true value, we have taken $60,000 as a conservative estimate of the land value in that year. It has been assumed that the use value of the residence and stable has been sufficient to cover the carrying charges on three of the fifteen lots during the whole period of eighty-one years. The use value was undoubtedly greater than this during the years when the mansion was new and when the vacant part of the tract was used as a spacious lawn and garden, but at that time the carrying charges on the land were only from $5,000 to $9,000 a year. Since the house has long been obsolete its present value can be but a small fraction of the 1921 carrying charge of $130,000.

2. Fifth Avenue above 39th Street. This parcel has been held vacant by the Wendel estate since 1845 when it was purchased with adjoining land for $8,000. On the basis of this sale this frontage of 54 feet on Fifth Avenue was valued at about $3,000. The development of Fifth Avenue first as a residence and then as a business center has given to this parcel the most rapid and consistent increase in value of any of the parcels studied.
3. Fifth Avenue and 73d Street. This corner lot with an avenue frontage of 77.2 feet and a depth of 130 feet was sold in 1866, with dimensions as at present, for $82,500. It has never been improved.

4. Fifth Avenue above 75th Street. This is an interior lot with a frontage of 67.2 feet. A tract including this lot was purchased in 1860 for $48,000. By a comparison of assessed valuations of the lots in this tract it appears that the sale value of this lot alone in 1860 was about $20,000.
5. Fifth Avenue, 95th to 96th Streets. This entire block frontage is still vacant, altho never held under one ownership. By a comparison of a number of sales in this tract from 1853 to 1859 with the corresponding assessed valuations, the probable value of this tract is fixed at $11,400 in 1856.
6. Fifth Avenue, 97th to 98th Streets. By a comparison of sales and valuations the value of this block frontage in 1865 is estimated at $65,000.
7. West 64th Street near Broadway. This parcel has a frontage of 100 feet on 64th Street near its intersection with Broadway and Columbus Avenue, and also a diagonal frontage of 29 feet on Broadway. On the basis of several sales, including parts of the lot under consideration, the value of the whole lot in 1854 is estimated at $3,000. It has never been adequately improved, altho at present it is being used as a gasoline filling station with a driveway through from Broadway to 64th Street.
8. Central Park West and 97th Street. This corner plot with a frontage of 100 feet on Central Park West and 200 feet on 97th Street was sold with other land in 1859. On the basis of this sale and a sale of an adjoining lot the value in that year is estimated at $15,000. In 1918 it was fully improved with apartment houses so all computation of carrying charges ends with 1917.
9. Riverside Drive, 109th Street to Cathedral Parkway. This large lot was originally part of a larger


Auction Sales
Key—
Sale Price
Taxes, etc.
Interest on Sale Price
Interest on Taxes, etc.
100% — Value in 1914
Base Year
1. 1913
2. 1912
3. 1909
4. 1908
5. 1907
6. 1906
7. 1909
8. 1906
9. 1905
10. 1906

tract extending from old Bloomingdale Road to the Hudson River. A part of the tract was taken by the city for Riverside Drive in 1873 and in 1880 a small strip on the east was added by the closing of Bloomingdale Road. The value in 1880 is estimated at $60,000 from a comparison of the assessed valuation and sales in that year. The owners have received an income of perhaps $3,000 a year for the past few years from the rental of bill board space. A large apartment house is now under construction on this lot.

The following tables give the most important results of the study of these nine cases. Table I gives the total figures in each item of the carrying charges on each of the nine parcels from the original base year together with the totals of these items and the estimated value in 1921. This estimate is based upon an assumed ratio of 95 between the assessed valuation and the true value. The New York City Tax Department has endeavored to assess property at its full value since 1911, but the evidence of actual conveyance indicates a slight underassessment in 1921.[2]

On the original computation each of these parcels was traced back as far as it could be separately identified on the tax records, and as far as the different items of carrying charge could be determined with a fair degree of accuracy. This method resulted in nine different base years, ranging from 1840 to 1880, with base-year values ranging from .3 per cent to 15.0 per cent of the value in 1921. In order to make the results of the separate computations comparable one with another, the value of each parcel was estimated for 1880

---

[2] A sample of 162 widely distributed sales in 1921, excluding foreclosures, shows a median ratio of assessed valuation to sale price of 94. Nearly all were sales of partly improved land, as it was impossible to find enough sales of vacant land in Manhattan to establish a trustworthy median.

TABLE I. — VACANT LAND, MANHATTAN

No.	Location and base year	Value in base year	Taxes	Special assessments	Interest on base value comp. at 4%	Interest on taxes comp. at 4%	Interest on special assessments comp. at 4%	Total cost	Value in 1921
1	14th St., 1840 est.	$60,000	$385,881	$5,072	$1,102,209	$749,234	$33,614	$2,336,010	$726,000
2	Fifth Ave. and 39th, 1845 sale	3,000	311,781	1,031	56,109	290,552	8,487	670,960	932,000
3	Fifth Ave. and 73d, 1866 sale	82,500	320,741	3,337	631,189	335,523	18,568	1,391,858	726,000
4	Fifth Ave. and 75th, 1860 sale	20,000	203,683	1,664	198,720	214,630	10,784	649,481	458,000
5	Fifth Ave. and 95th, 1856 sale	11,400	301,147	10,355	134,617	320,994	47,161	825,674	737,000
6	Fifth Ave. and 97th, 1865 sale	65,000	184,546	11,781	519,185	219,466	52,089	1,052,067	474,000
7	64th St. and Broadway, 1854 sale	3,000	100,771	7,541	38,565	91,499	48,374	289,750	388,000
8	Central Pk. W. and 97th, 1859 sale	15,000	78,329	7,187	130,892	91,437	24,202	347,047	195,000
9	Riverside Drive and 109th, 1880 est.	60,000	156,509	21,689	241,231	106,757	46,884	633,070	421,000
	Total	$319,900	$2,043,388	$69,657	$3,052,717	$2,420,092	$290,163	$8,195,917	$5,057,000

TABLE II. — VACANT LAND, MANHATTAN. 1880–1921

No.	Location	Value in 1880	Taxes	Special assessments	Interest on base value comp. at 4%	Interest on taxes comp. at 4%	Interest on special assessments comp. at 4%	Total cost	Value in 1921
1	14th St.	$320,000	$323,050	....	$1,022,303	$299,799	....	$1,965,152	$726,000
2	Fifth Ave. and 39th	75,000	294,694	487	299,478	179,376	701	849,736	932,000
3	Fifth Ave. and 73d	150,000	301,492	479	599,351	232,966	1,156	1,285,444	726,000
4	Fifth Ave. and 75th	90,000	190,974	353	359,284	144,750	514	785,875	458,000
5	Fifth Ave. and 95th	150,000	281,252	4,463	599,351	206,817	10,730	1,252,613	737,000
6	Fifth Ave. and 97th	90,000	168,322	3,334	359,284	129,670	8,522	759,132	474,000
7	64th St. and Broadway	35,000	95,001	1,106	139,733	55,086	2,944	328,870	388,000
8	Central Pk. W. and 97th	42,500	70,413	2,440	138,897	51,927	4,678	310,855	195,000
9	Riverside Drive and 109th	60,000	156,509	21,689	241,231	106,757	46,884	633,070	421,000
	Total	1,012,500	1,881,707	34,351	3,758,912	1,407,148	76,129	8,170,747	5,057,000
	Total 2–9	$692,500	$1,558,657	$34,351	$2,736,609	$1,107,349	$76,129	$6,205,595	$4,331,000

and the various items of carrying charge recomputed as from that date (Table II). The assessed valuations in 1880 were found to be about 50 per cent of sale values,[3] and this ratio was used in the estimates, corrections being made wherever specific sales of the property, or property in the immediate vicinity, indicated a different local ratio. The year 1880 was selected as the common base year, not only because it was the earliest year common to all the original computations, but because 1880 is generally considered to have been a normal business year. Land values had recovered from the depression following the crisis of 1873 and the general level of commodity prices was again normal.[4]

A comparison between the percentage tables III and IV shows that when all the items are taken into

TABLE III. — VACANT LAND, MANHATTAN

Costs as percentages of value in 1921

Base year	Value in base year	Taxes	Special assessments	Interest on base value	Interest on taxes	Interest on special assessments	Total cost	Value in 1921
1. 1840	8.3	53.2	.7	171.7	103.2	4.6	321.7	100.0
2. 1845	.3	33.5	.1	6.0	31.2	.9	72.0	100.0
3. 1866	11.8	44.2	.5	86.9	46.2	2.6	191.7	100.0
4. 1860	4.4	44.5	.4	43.4	46.8	2.3	141.8	100.0
5. 1856	1.5	40.9	1.4	18.3	43.5	6.4	112.0	100.0
6. 1865	13.7	38.9	2.5	109.5	46.3	11.0	221.9	100.0
7. 1854	.8	26.0	1.9	9.9	23.6	12.5	74.7	100.0
8. 1859	7.7	40.2	3.7	67.1	46.9	12.4	178.0	100.0
9. 1880	14.2	37.2	5.2	57.3	25.4	11.1	150.4	100.0
Total	6.3	40.4	1.4	60.4	47.9	5.7	162.1	100.0

---

[3] An analysis of 213 sales of land in 1880 for which considerations were stated shows a median ratio of exactly 50. Of these sales 129 were of vacant land showing a median ratio of 43.5. The 84 improved parcels showed a median ratio of 67.

[4] For the whole of Manhattan Island the real estate valuation in 1880 was $919,669,205. Assuming a 50 per cent valuation and assuming that the value of the land was slightly in excess of the value of improvements we arrive at an estimated land value in 1880 of $1,000,000,000. The estimated land value in 1921 was $3,468,000,000, of which the value in 1880 was 28.8 per cent. Taking the value in 1880 as a base, land values in Manhattan as a whole have risen 250 per cent while the values of the nine parcels considered have increased 400 per cent. It is evident, therefore, that the parcels selected have increased in value much more rapidly than has the average parcel of land in Manhattan.

TABLE IV. — VACANT LAND, MANHATTAN. 1880–1921

Costs as percentages of value in 1921

No.	Value in base year 1880	Taxes	Special assessments	Interest on base value	Interest on taxes	Interest on special assessments	Total cost	Value in 1921
1	44.1	44.5	...	140.8	41.3	...	270.7	100.0
2	8.1	31.6	...	32.1	19.3	.1	91.2	100.0
3	20.7	41.5	.1	82.5	32.1	.2	177.1	100.0
4	19.7	41.7	.1	78.4	31.6	.1	171.6	100.0
5	20.4	38.1	.6	81.3	28.1	1.5	170.0	100.0
6	19.0	35.5	.7	75.8	27.4	1.8	160.2	100.0
7	9.0	24.5	.3	36.0	14.2	.8	84.8	100.0
8	21.8	36.1	1.3	71.2	26.6	2.4	159.4	100.0
9	14.2	37.2	5.2	57.8	25.4	11.1	150.4	100.0
Total	20.0	37.2	.7	74.3	27.8	1.5	161.5	100.0
Total, 2–9....	16.0	36.0	.8	63.2	25.5	1.8	143.3	100.0

consideration the change in the base year made comparatively little difference. In Table IV the average base-year value is 20.0 per cent as compared with 6.3 per cent in Table III, but owing to the shorter period of computation the items of taxes and assessments with interest are enough lower so that the average of the total cost column in one table is 162.1 per cent and in the other 161.5 per cent of the total land value in 1921. It will be noted that the figures in the tax column are only slightly lower in Table IV than in Table III. This is not only due to the low assessed valuations before 1880 but to the low tax rate. From 1840 to 1861 the median tax rate was 1.02 on an assessed valuation about 50 per cent of the sale value. This is equivalent to a tax rate on a true valuation of .5 per cent. From 1861 to 1880 the median rate was about 0.90. From 1880 to 1910 the median rate was 1.12 and from 1911 to 1921 it was 2.02 with a rate of 2.77 in 1921. Special assessments have increased even more rapidly than taxes. The early assessments for public improvements were so light that in these parcels, located in the older parts of the city, the assessments amount to a comparatively small item of carrying charge. It is also true that many of the heaviest assessments which were levied on these properties came at a still earlier date than that at which the computation begins. Taking simply the base value in 1880 without interest and adding the taxes and assessments with interest on these payments to the city, the total cost to the owners has been 87.2 per cent of the 1921 value, leaving only 12.8 per cent of the present value or 37.7 per cent of the value in 1880 as interest on the base value over a period of forty-one years.

The greatest losses were sustained in the Fourteenth Street section. In Parcel 1, the taxes and interest on taxes on only four-fifths of the property amount to 85.8 per cent of the present value of the whole, or 107.0 per cent of the value of the four-fifths alone. If no allowance were made for improvements [5] the value in 1880 with the actual taxes paid since that date, without any interest items, would exceed by 4 per cent the value in 1921. While this property is now worth only a little more than double its value in 1880 the parcel on Fifth Avenue above 39th Street is now valued at eleven times the estimate for 1880. But even here the owner has paid one-third of its present value in taxes and allowing 4 per cent interest on the value in 1880 the total cost in 1921 is 91.2 per cent. The parcel on West 64th Street has increased to more than ten times its value in 1880, and even in the past eight years it has increased over 50 per cent. Here the taxes have been only 24.5 per cent and the total cost 84.8 per cent of the present value. From the owner's point of view this is the most favorable showing of any of the nine parcels, but it is equivalent only to an investment yielding about 5 per cent interest.

[5] In 1904 the buildings were valued at $20,000 in a total valuation of $950,000. In 1920 the buildings were valued at $2,000.

The parcels on upper Fifth Avenue and Central Park West have increased to about five times their value in 1880 but the taxes alone have been double the base value and, including the interest items, the total cost of the five parcels ranges from 160.2 to 177.1 per cent of their value in 1921.

All but one of these parcels have increased in value more rapidly than has Manhattan Island as a whole. Only two parcels, and these in the two most rapidly growing business sections of the city, have yielded to the owner an interest return of more than 4 per cent. If, however, these parcels had been kept improved with buildings which would rent for enough to pay all carrying charges, including amortization, and then sold at the 1921 valuation there would have been an "unearned increment" of $4,045,000 over a base value of $1,012,500, in addition to a normal return of the investment, equivalent to 4 per cent interest compounded annually on the base value for forty-one years.

II

WASHINGTON HEIGHTS

In the extreme northern part of Manhattan Island the period of rapid development has been comparatively recent and it was found possible to trace a relatively large tract through its whole course of development from agricultural land to valuable city property. The tract selected was originally a farm of about 38 acres, now covered by about fourteen city blocks, on Washington Heights. The tract studied is located between Broadway and Amsterdam Avenue and runs from 178th to 182d Streets. It includes a particularly valuable corner at 181st Street and St. Nicholas Avenue with a subway station and local shopping district, and has a direct connection with the Bronx across Washington Bridge. In 1891 this tract was subdivided into 411 lots and sold at public auction. The year 1891 was therefore taken as the base year for the subsequent computations and the value in the base year was considered equal to the total proceeds of the sale. The first houses were built in the following year and by 1898 41 lots, or 10 per cent, were improved by buildings. The opening of the subway gave a great impetus to development and by 1909 the tract was 51 per cent improved. In 1921 only 38 out of the 411 lots remained vacant. The increase in the value of the land has been unusually rapid. In 1906, the first year in which the Tax Department published separate valuations for land and buildings by sections, the land in this tract was valued for taxation at $3,144,300. In 1921 the same land was valued at $8,996,100, an increase of 186 per cent.[6] During the same period the valuation of all land in the Tax Department Section 8, which includes Washington Heights, has increased about 100 per cent, and all land in the borough of Manhattan about 25 per cent.[7]

In the following tables, carrying charges have been computed on the tract as a whole and also separately on the 38 lots which still remained vacant at the beginning of 1921 and on the 41 lots which were first improved.

For the whole tract the owners paid to the city $1,134,500 in special assessments and in taxes on vacant land. Including interest chargeable to vacant land the total was $1,633,891 or 18.1 per cent of the 1921 value. On the portion remaining vacant to 1921

---

[6] Sales in the Washington Heights section in 1921 indicated 100 per cent valuation.

[7] An examination of 303 sales in 1906 shows a median ratio of valuation to sale price of 76. There has been very little actual increase in general land values in Manhattan Island since 1906. See Section IV.

TABLE V. — TRACT ON WASHINGTON HEIGHTS, 178TH TO 182D STREETS

	Base year	Sale value	Taxes on vacant land	Special assessments	Interest on sale value comp. at 4%	Interest on taxes comp. at 4%	Interest on special assessments comp. at 4%	Total cost	Value in 1921
Entire tract	1891	$1,490,420	$653,475	$481,025	$1,642,380	$234,651	$264,740	$4,766,691	$8,996,100[1]
First improved tenth	1891	124,422	4,352	40,672	22,203	508	534	192,691	729,500
Unimproved tenth	1891	131,450	165,248	46,495	294,892	76,412	59,370	773,867	474,500
Entire tract	1891	16.6	7.3	5.4	18.2	2.6	2.9	53.0	100.0
First improved tenth	1891	17.0	.6	5.6	8.0	.1	.1	26.4	100.0
Unimproved tenth	1891	27.7	34.8	9.8	62.2	16.1	12.5	163.0	100.0

---

[1] Assessed valuation. Sales in 1921 indicate 100% assessment.

TABLE VI. — TRACT 1. WASHINGTON HEIGHTS, BEFORE 1891. TRACT 2. NORTH BRONX, 1894–1921

Tract	Period of computation	Value in base year	Taxes	Special assessments	Interest on base value comp. at 4%	Interest on taxes comp. at 4%	Interest on special assessments comp. at 4%	Total cost	Value final year
1	1850–1891	$24,000	$104,080	$77,409	$95,733	$75,474	$67,313	$444,009	$980,000
1	1868–1891	330,174	90,769	76,678	483,612	48,128	64,140	1,093,501	980,000
2	1894–1921	312,722	204,599	74,900	589,027	93,738	14,840	1,289,826	514,100
1	1850–1891	2.4	10.6	7.9	9.8	7.7	6.9	45.3	100.0
1	1868–1891	33.7	9.3	7.8	49.4	4.9	6.5	111.6	100.0
2	1894–1921	60.8	39.8	14.6	114.6	18.2	2.9	250.9	100.0

the corresponding charges were $211,943 for taxes and assessments, or with interest $347,525, or 73.2 per cent of the 1921 value. On the portion first improved the same charges were $45,024, or with interest $46,066, or 6.3 per cent of the 1921 value. In these three computations interest charges on the base value differ even more widely because of the allowances for improvements. On the tract as a whole and on the first improved tenth the owners have enjoyed a material net increment of land value over the total cost including interest, but on the unimproved tenth the total carrying charges more than offset the increase in value, which increase, however, was not relatively as great as in the tract as a whole.

For a number of years prior to the auction of 1891 the tract as acreage had an interesting history. (See Table VI.) It was first sold as city property in 1868 when it was purchased by General Daniel Butterfield and Richard Schell for $330,174. In 1879 it was sold in foreclosure proceedings for $225,000. It was sold again in 1880 for $315,000, in 1883 for $450,000, in 1885 for $350,000, and in 1891 for $980,000. In 1850 it was valued for taxation at $8,000 which was probably no more than one-third of its true value.[8] From a base value of $24,000 in 1850 the total cost including interest to 1885 was $316,364, as compared with the value as measured by the sale in that year of $350,000. It is evident, therefore, that practically the whole net increment in forty-one years was taken by those who held the property from 1885 to 1891. General Butterfield and his partner from 1868 to 1879 lost their whole equity of $50,000 and in addition paid taxes amounting to $34,234 and special assessments of $62,817. In addition the property was encumbered with mortgages amounting to $280,000 on which interest was paid for several years.

---

[8] Vacant land in the upper part of Manhattan was assessed very low at this time. Seventeen sales of land in the old 12th Ward above 86th Street between 1850 and 1854 show a median ratio of valuation to sale price of 30.

Basing the computation on the purchase price in 1868—$330,174—the total carrying charges to 1891 including interest amount to $1,093,501 or 111.6 per cent of the selling price in April of that year and 72.5 per cent of the gross proceeds of the auction sale which took place in the following month.

The tract of about 90 acres in the Bronx was in 1894 in a similar position to that of the Washington Heights tract in 1868. Both were vacant acreage tracts and sold for approximately the same price. In the older tract the computation of Table VI covers twenty-three years and in the newer tract, twenty-seven years. In Tract 1, the value increased to $980,000 while in Tract 2 over a longer period the value increased only to $514,100. The total cost including interest items in Tract 1 was only 111.6 per cent of the selling price while in Tract 2 the total cost was 250.9 per cent of the value in 1921. The most striking difference is in the item of taxes. In Tract 2 on a lower actual value, the taxes were more than twice as heavy as in Tract 1. Very few special assessments have as yet been levied on Tract 2.[9]

III

AUCTION SALES

After a tract such as the property described above has passed through a period of speculation as acreage, it is usually subdivided into building lots, which are

---

[9] In the Washington Heights tract in which all the street improvements were completed by 1911 the total cost was about $13,500 an acre. With the increased cost of labor and materials the anticipated future expense of street improvements on the 90-acre Bronx tract probably tends to discourage speculation and to prevent values from increasing.

TABLE VII. — Auction Sales

No.		Base year	Sale price	Taxes on vacant land	Special assessments	Interest on sale price[1]	Interest on taxes[1]	Interest on special assessments[1]	Total cost	Value in 1921
1	Morris Park	1913	$3,674,590	$489,448	$728,793	$1,335,158	$67,782	$79,359	$6,375,130	$2,741,900
2	Van Cortlandt	1912	1,384,175	205,033	246,504	549,986	33,461	41,680	2,460,839	1,091,650
3	Riverdale	1909	260,075	49,551	57,508	151,798	11,249	13,094	543,275	200,975
4	Throg's Neck	1908	366,549	88,862	61,439	221,256	20,910	3,419	762,435	401,900
5	Ogden estate	1907	1,520,825	357,943	223,263	952,558	97,962	83,902	3,236,453	1,706,300
6	Beck estate	1905	1,229,400	195,170	122,832	604,929	47,082	31,242	2,230,655	1,474,100
7	Martense farm	1909	146,200	35,551	51,804	79,228	7,615	14,299	334,697	201,300
8	Canarsie	1906	131,600	36,094	....	95,404	11,197	....	274,295	123,300
9	Bay Ridge	1905	181,195	54,907	34,612	118,380	13,549	22,351	424,994	277,000
10	Livingston	1906	105,700	23,441	16,567	82,355	6,494	3,439	237,996	102,500
	Total		$9,000,309	$1,536,000	$1,543,322	$4,191,052	$317,301	$292,785	$16,880,769	$8,320,825

[1] Interest at 4% compounded annually, computed only in proportion to value of land remaining unimproved at the end of each year.

TABLE VIII. — Auction Sales. Base Year, 1913

No.		Value in 1913	Taxes on vacant land	Special assessments	Interest on estimated value[1]	Interest on taxes[1]	Interest on special assessments[1]	Total cost	Value in 1921
1	Morris Park	$3,674,590[2]	$489,448	$728,793	$1,335,158	$67,782	$79,359	$6,375,130	$2,741,800
2	Van Cortlandt	1,103,000	185,206	246,504	396,925	26,540	41,680	1,999,855	1,091,650
3	Riverdale	219,475	36,839	53,601	76,497	5,628	11,393	403,433	200,975
4	Throg's Neck	353,200	64,592	61,439	116,720	9,154	3,419	608,524	401,900
5	Ogden estate	1,461,940	227,070	127,028	452,260	32,036	31,408	2,331,742	1,706,300
6	Beck estate	1,343,450	85,278	19,670	167,890	12,157	1,543	1,629,988	1,474,100
7	Martense farm	143,250	27,298	39,172	46,393	3,982	9,518	269,613	201,300
8	Canarsie	136,275	20,186	....	44,862	2,915	....	204,238	123,300
9	Bay Ridge	265,750	31,048	485	63,695	4,201	99	365,278	277,000
10	Livingston	87,500	14,546	14,314	30,114	1,924	1,925	150,323	102,500
	Total	$8,788,430	$1,181,511	$1,291,006	$2,730,514	$166,319	$180,344	$14,338,124	$8,320,825

[1] Interest at 4% compounded annually, computed only in proportion to value of land remaining unimproved at the end of each year.

[2] Sale price.

sold separately to prospective home builders or small speculators, either at private sale or at a public auction.

The ten tracts discussed in this section were sold at auction at different times between 1905 and 1913. They were selected from among the larger well advertised sales of the period without reference to subsequent development. During this period more sales were held in the Bronx than elsewhere, and because of this fact, six out of the ten tracts are located in that borough. No sales were available in Queens, so that the conclusions do not necessarily apply to conditions in that borough. The tracts selected are, however, certainly typical of the Bronx and probably of Brooklyn and Richmond.

1. The first of these tracts is the property between the New Haven Railroad and Bronx and Pelham Parkway known as Morris Park. The eastern part of it was formerly a race track, and was therefore level and well located for building. The property is cut by the N. Y., Westchester and Boston Electric Railway, and west of the tracks the land is low and not well drained. The whole property of about 230 acres was divided into 3019 lots and sold at auction between May 31 and June 13, 1913. It was described as the largest auction sale of vacant land ever held in New York. The tract was practically vacant in 1913 and only 1.3 per cent improved at the beginning of 1921.
2. In 1912, 700 lots belonging to the Van Cortlandt estate, south of Van Cortlandt Park and east of Broadway were sold at auction. Near Broadway the land is flat and rather low, but to the east the property extends up over a steep hill to the Jerome Park Reservoir. By 1921 4 per cent of the lots were improved.

3. The Samler estate sale was held in 1909. The property consists of 212 lots on the west side of Broadway between 253d and 256th Streets. The lots are nearly all on a steep hillside, but they are easily reached and will be very desirable when opened by street improvements. By 1921, 6 per cent of the lots were improved by buildings.
4. The William Layton estate at Throg's Neck was sold at auction in 1908. The property consisted of 700 lots on and near Eastern Boulevard and extending to Eastchester Bay. At the time it was some distance from any rapid transit line, but it has been made more accessible by the construction of the Westchester Avenue Extension of the subway. The tax valuation for 1921 indicated that 11.6 per cent of the lots were then improved.
5. A tract of 871 lots belonging to the Ogden estate was sold at auction in 1907. The property is directly across Washington Bridge from the Washington Heights tract described in Section II. It extends south from Washington Bridge to High Bridge, and includes much of the steep hillside and some well located lots on the top of the hill. The tract is now 19.6 per cent improved.
6. In 1905, the Beck estate sold at auction 315 lots, more or less scattered east of Boston Road and south of 173d Street. This property was already easily reached by the Third Avenue Elevated, and many lots in the same blocks were already improved. All the streets were open and some of them were paved at the time of sale. More than 200, or 72.8 per cent, of these lots were improved by 1921.
7. The Martense farm in Brooklyn south of Prospect Park was sold at auction in 1909. The property

consisted of 241 lots between Church Avenue and Tehama Street and between 36th and West Streets. The property is now reached by a subway line and is building up rapidly. At the beginning of 1921 it was 29.4 per cent improved.

8. In 1906 a tract of 266 lots in Canarsie was sold at auction. The property extended from East 86th Street to Canarsie Road and from Avenue L to Avenue M. The land is rather low, but not swampy. It is within a few blocks of Jamaica Bay, and is reached by a recent subway extension. It is now 13.4 per cent improved.
9. A part of the original Bennett estate in Bay Ridge, Brooklyn, consisting of 172 lots was sold at auction in 1905. This property is well located between 1st Avenue and Shore Road and between 71st and 73d Streets. It overlooks New York Bay, and is reached by the Bay Ridge Elevated line. By 1921, 36.6 per cent of the lots were improved.
10. A tract of 278 lots belonging to the Hoyt estate at Livingston, Staten Island, was sold at auction in 1906. The property adjoins the land of the Sailor's Snug Harbor. The land is high and the soil sandy. It is reached by the Castleton Avenue surface car line. It is now building up with attractive one-family houses. At the beginning of 1921 it was 8.6 per cent improved.

Table IV shows the carrying charges from the date of sale to 1921 on each of these ten tracts. In Table VIII these same charges are computed from 1913 in order to eliminate the variations due to the different dates of sale. Table IX and Table X show these carrying charges as percentages of the value in 1921.

It will be noted that the greatest losses both absolute and relative in eight years were suffered by the owners

TABLE IX. — AUCTION SALES

Costs as percentages of value in 1921

	Base year	Sale price	Taxes	Special assessments	Interest on sale price	Interest on taxes	Interest on special assessments	Total cost	Value in 1921
1. Morris Park	1913	134.0	17.8	26.6	48.7	2.5	2.9	232.5	100.0
2. Van Cortlandt	1912	126.8	18.8	22.6	50.3	3.1	3.8	225.4	100.0
3. Riverdale.....	1909	129.5	24.6	28.6	75.5	5.6	6.5	270.3	100.0
4. Throg's Neck .	1908	91.3	22.1	15.3	55.0	5.2	.8	189.7	100.0
5. Ogden estate	1907	89.2	21.0	13.1	55.8	5.7	4.9	189.7	100.0
6. Beck estate ..	1905	83.4	13.2	8.3	41.0	3.2	2.1	151.2	100.0
7. Martense farm	1909	72.6	17.7	25.7	39.4	3.8	7.1	166.3	100.0
8. Canarsie......	1906	106.7	29.3	—	77.4	9.1	—	222.5	100.0
9. Bay Ridge....	1905	65.4	19.8	12.5	42.7	4.9	8.1	153.4	100.0
10. Livingston....	1906	103.1	22.9	16.2	80.3	6.3	3.4	232.2	100.0

TABLE X. — AUCTION SALES, BASE YEAR 1913

Costs as percentages of value in 1921

	Sale price	Taxes	Special assessments	Interest on sale price	Interest on taxes	Interest on special assessments	Total cost	Value in 1921
1. Morris Park	134.8[1]	17.8	26.6	48.7	2.5	2.9	232.5	100.0
2. Van Cortlandt	101.0	17.0	22.6	36.4	2.4	3.8	183.2	100.0
3. Riverdale..........	109.1	18.3	26.7	38.1	2.8	5.7	200.7	100.0
4. Throg's Neck	87.9	16.1	15.3	29.0	2.3	.8	151.4	100.0
5. Ogden estate	85.7	13.3	7.4	26.5	1.9	1.8	136.6	100.0
6. Beck estate	91.1	5.8	1.3	11.4	.8	.1	110.5	100.0
7. Martense farm	71.1	13.6	19.5	23.0	2.0	4.7	133.9	100.0
8. Canarsie..........	110.5	16.4	...	36.4	2.4	...	165.7	100.0
9. Bay Ridge.........	95.9	11.2	.2	23.0	1.5	...	131.8	100.0
10. Livingston.........	85.3	14.2	14.0	29.4	1.9	1.9	146.7	100.0
Total...........	105.6	14.2	15.5	32.8	2.0	2.2	172.3	100.0

[1] Sale price.

of the Morris Park tract. A large proportion of the lots in this tract can now be bought for less than the price paid at the auction in 1913. In eight years the owners have paid in taxes and assessments with interest 50 per cent of the value in 1921. The original cost with interest brings the total cost to 230 per cent of the present value. The actual condition of the individual owner was even worse, for 70 per cent of the purchase price was allowed to remain on mortgage, so that on a large part of the total purchase price the rate of interest was 6 per cent, instead of 4 as calculated. To make the story concrete it may be assumed that a typical purchaser bought two lots at the sale for which he paid $2,434, giving him a building plot of 50 × 100 feet. He paid $730 in cash and assumed a mortgage of $1,704 at 6 per cent. His annual carrying charge in 1914 was $188.44 for taxes, assessments and interest. By 1919 his taxes and special assessments alone amounted to $243. In eight years his tax payments totaled $326, his special assessments $486 and his interest including interest on mortgage and savings bank interest on his down payment, $1,309. At the end of 1921 his lots have cost him $4,555 and they are now valued at $1,816. On the improved property in Washington Heights the special assessments alone have totaled over $1,000 a lot. On this basis without allowing for increased costs the typical owner of two lots in Morris Park still has $1,500 to pay for necessary improvements,[1] in addition to ordinary taxes which are now $51 a year on a plot measuring 50 × 100 feet.

In Tract 3 (the Samler estate), in Tract 8 (Canarsie), and in Tract 10 (Livingston), the percentages of total loss since the date of sale have been even greater than in the Morris Park tract, altho the period of computation is longer. In Tract 6, the Beck estate, where improvement began soon after the sale, and continued until it is now 72.8 per cent improved, the total cost including interest has been 151.0 per cent of the present value. In this tract the special assessments and the taxes on vacant land without interest, amount to 21.5 per cent, while the total increase in value since 1905 is only 16.8 per cent of the value in 1921. This tract shows by far the most favorable results of any of the ten tracts studied. Since 1913 the total increase in value has been slightly more than the taxes and special assessments, without interest.

---

[1] The land is, however, fairly level, and it is possible that the expense of grading and sewer installation may be less than on Washington Heights.

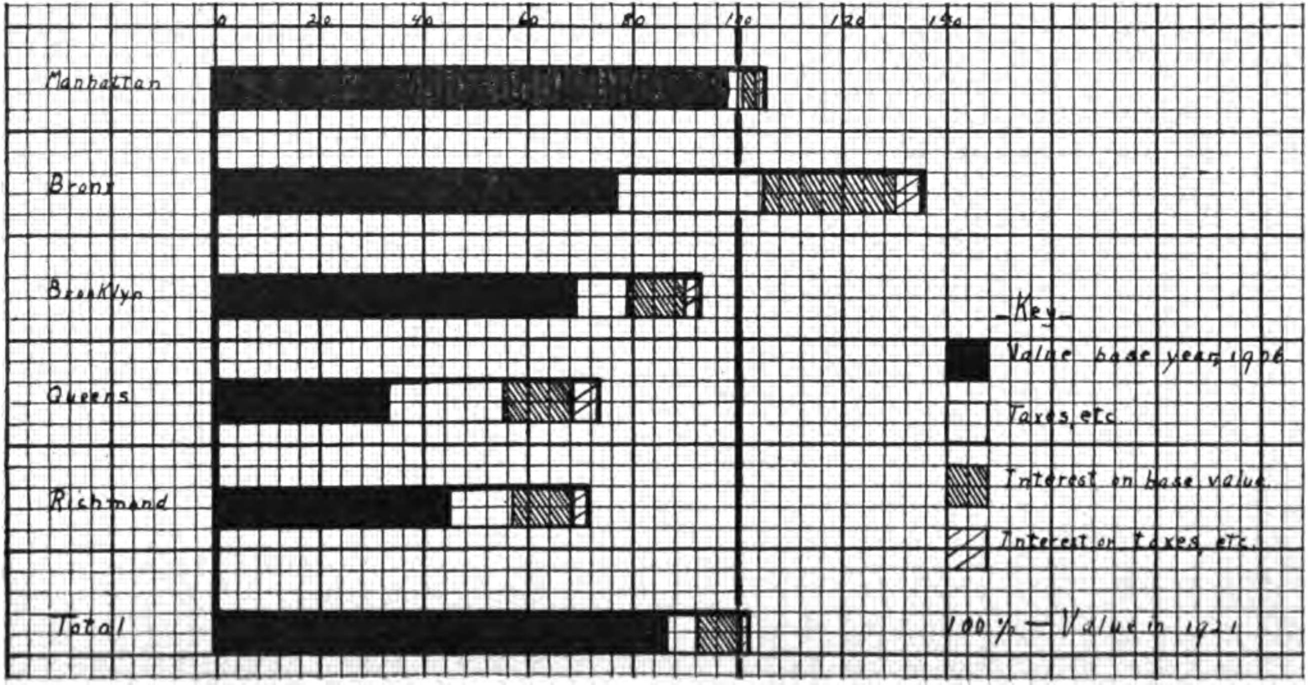
Because of the shorter period which these computations cover the distribution of the various items of cost is quite different from that in the study of the vacant tracts in Manhattan. Based upon the values in 1921 the average value of the Manhattan tracts in 1880 was 21.1 per cent, while the average value of the tracts sold at auction was, in 1913, 106 per cent of the 1921 value, or without the Morris Park tract, 92.3 per cent. In Table X as compared with Table IV, interest on the purchase price, taxes and interest on taxes are all low, but special assessments are much higher.

During the year 1921 there was great activity in the disposal of large tracts by means of auction sales. In the advertising the same phrases were used as in the advertising of the sales between 1905 and 1913, and the same promises were made of great increases in values. It is not within the province of this article to make forecasts, but with taxes in the Bronx at 2.84, prospective special assessments of at least $1,000 a lot and allowing merely savings bank interest at 4 per cent, it is obvious that the land must increase in value from 10 to 15 per cent a year in order to justify an investment in vacant land which cannot be immediately improved.

IV

New York City by Boroughs

Since 1906 the New York City Tax Department has published reports showing not only the total valuation of real estate but the valuation of land alone by boroughs and sections. Beginning with 1910 the value of vacant land by boroughs is separately stated in the



Land Values in New York City, 1906–21

reports. By projecting back to 1906 the percentage curve of the value of vacant land by boroughs it is possible to construct tables by boroughs on the same basis as that used for the separate tracts already discussed. In order to arrive at an estimate of the true value of land in 1906 in the borough of Manhattan, 303 actual transfers in that year with consideration stated were compured with the assessed valuations. The median of these 303 ratios was 76, showing that the land was valued for taxation at approximately 76 per cent of its sale value. In Brooklyn a similar test with 100 transfers showed a median ratio of 70 per cent. No test has been made in the other boroughs on account of the difficulty in obtaining satisfactory material. Since 1914 the ratio of assessed valuations to sales has been computed and published by the Tax Department by boroughs. In these years the ratio for Manhattan is nearly always the highest of the five boroughs, the Bronx is second, Brooklyn third, Queens fourth and Richmond the lowest. In has, therefore, been assumed for the purposes of this computation that the ratio in 1906 was 76 for Manhattan, 75 for the Bronx, and 70 for Brooklyn, Queens, and Richmond.

In 1921 a comparison of sale prices with assessed valuations was made for four of the five boroughs. In order to arrive at the land value apart from the value of land and buildings, only transfers of vacant and slightly improved land were used. In Manhattan 190 sales gave a median ratio of assessed valuations to sale prices of 96.5. Excluding foreclosures, the median ratio was 94. In the Bronx 93 sales, excluding foreclosures, gave a median ratio of 100. In Brooklyn the median ratio of 84 sales, excluding foreclosures, was 91 and in Queens 32 sales gave a median ratio of 83. Since the conveyances in Richmond are not published it was impracticable to make a similar test in that borough. The New York City Tax Department endeavors to assess at full value, so where the number of sales available is small it has been thought proper to make an allowance in the direction of a higher ratio. In the accompanying Tables XI and XII, therefore, the assumed ratio of assessed valuations to sale prices is: Bronx, 100; Manhattan and Brooklyn, 95; Queens and Richmond, 90.

In the borough of Manhattan it appears that land values have increased only 1.4 per cent in fifteen years. Even if we assumed a ratio of 90, the total land value would be only $3,661,000,000, an increase of $240,000,000 or 7 per cent in fifteen years. In the same period the special assessments plus the taxes and interest attributable to vacant land amount to $213,000,000. It is evident, therefore, that there has been no appreciable net increase in land values in fifteen years and if our estimate of the land value of Manhattan is correct there has been a net loss of 4½ per cent. There have been, of course, large increases in certain sections, but these have been offset by losses in other parts of the borough.

In the Bronx the gross increase in value has been 30.9 per cent but the carrying charges have been 76.7 per cent, giving a net loss of 45.8 per cent of the 1906 value or 35.1 per cent of the 1921 value. Allowing again for a wide margin of possible error (10 per cent), the net loss in the Bronx is at least 25 per cent of the present value. The special assessments and taxes on vacant land alone without interest amount to more than the total increase in value since 1906.

In Brooklyn land has shown a very slight net increase while in Queens and Richmond the net increase in value is considerable. In Queens the gross increase

TABLE XI. — LAND VALUES IN NEW YORK CITY. 1906–21
(000 omitted)

Borough	Value in 1906 land only	Taxes paid on vacant land	Special assessments	Interest on 1906 value [1]	Interest on taxes [1]	Interest on special assessments [1]	Total cost	Assessed value of land in 1921	Estimated land value 1921
Manhattan	$3,421,000	$46,396	$19,719	$134,000	$12,798	$404	$3,634,317	$3,295,000	$3,468,420
Bronx	278,600	41,064	60,281	91,472	11,457	9,620	492,494	364,615	364,615
Brooklyn	651,876	44,613	51,798	102,533	12,085	3,773	866,678	892,559	939,536
Queens	116,100	40,230	34,316	46,022	11,442	4,354	252,464	309,175	343,528
Richmond	29,340	4,494	3,198	7,835	1,186	402	46,455	58,499	64,999
Total	$4,496,916	$176,797	$169,312	$381,862	$48,968	$18,553	$5,292,408	$4,919,848	$5,181,098

[1] Interest at 4% compounded annually, computed only in proportion to value of land remaining unimproved at the end of each year.

TABLE XII. — LAND VALUES IN NEW YORK CITY. 1906–21
Costs as percentages of value in 1921

Borough	Land value in 1906	Taxes	Special assessments	Interest on value	Interest on taxes	Interest on assessments	Total cost	Land value in 1921
Manhattan	98.6	1.3	.6	3.9	.4	....	104.8	100.0
Bronx	76.4	11.3	16.6	25.1	3.1	2.6	135.1	100.0
Brooklyn	69.4	4.7	5.5	10.9	1.3	.4	92.2	100.0
Queens	33.8	11.7	10.0	13.4	3.3	1.3	73.5	100.0
Richmond	45.1	6.9	4.9	12.1	1.8	.6	71.4	100.0
Total	86.8	3.4	3.3	7.4	.9	.4	102.2	100.0
Costs as percentages of value in 1906								
Manhattan	100.0	1.3	.6	3.9	.4	....	106.2	101.4
Bronx	100.0	14.7	21.6	32.9	4.1	3.4	176.7	130.9
Brooklyn	100.0	6.8	8.0	15.7	1.8	.6	132.9	144.1
Queens	100.0	34.6	29.6	39.6	9.9	3.8	217.5	295.9
Richmond	100.0	15.3	10.9	26.7	4.0	1.4	158.3	221.5
Total	100.0	3.9	3.8	8.5	1.1	.4	117.7	115.2

in value has been 195.9 per cent but the special assessments, added to the taxes on vacant land and interest amount to 117.5 per cent. The average gross increase in value of all land in Queens has been nearly 7 per cent a year. If, however, the special assessments, taxes on vacant land, and the interest on these items are deducted from the gross increase the net increase in value is about 5 per cent a year. Because of the unusual increases in value in Queens, the figures for this borough were further analyzed by wards, as indicated by Tables XIII and XIV. The highest gross rate of increase in value was found to be in Newtown, which was made accessible during the fifteen-year period by the opening of the Corona subway, the opening of direct communication with New York through the tunnel to the Pennsylvania station, and the opening of Queensboro Bridge connecting with Queens Boulevard which runs through the center of this ward. The net rate of increase was, however, higher in Flushing, where there have been as yet very few special assessments. The highest net rate of increase was in Rockaway. This rapid increase is all the more striking in that it occurred almost entirely in the years from 1906 to 1911. Since 1912 the valuation in Rockaway has remained practically stationary. Rockaway is the smallest ward in Queens in area, and has also the smallest percentage of vacant parcels, thus making the carrying charges comparatively light.

Separate computations were also made for a tract of 15,556 acres or 24.3 square miles in Brooklyn. This area is about one-third of the total area of the borough, and lies to the south and southeast of Prospect Park, but does not include Coney Island or the shores or islands of Jamaica Bay. It is in this part of Brooklyn that development has been most rapid in the sixteen years covered by the computation. This large tract

TABLE XIII. — BOROUGH OF QUEENS. LAND VALUES, 1906–21

Ward		Land value in 1906	Taxes paid on vacant land	Special assessments	Interest on 1906 value[1]	Interest on taxes[1]	Interest on special assessments[1]	Total cost	Assessed value of land in 1921	Estimated land value in 1921
1	Long Island City.	$34,416,000	$9,877,200	$12,806,000	$14,175,000	$2,736,500	$2,483,600	$76,494,300	$72,492,100	$80,546,800
2	Newtown	24,896,300	9,921,400	13,562,600	10,750,000	2,735,200	1,283,900	63,149,400	77,359,100	85,954,800
3	Flushing	17,616,500	6,394,100	1,042,100	6,480,000	1,920,500	97,300	33,550,500	49,412,400	54,902,700
4	Jamaica	28,011,200	11,452,300	6,789,700	11,720,000	3,348,800	480,300	61,802,300	78,823,000	87,581,000
5	Rockaway	11,160,700	2,584,900	115,900	2,897,000	702,400	8,600	17,469,500	31,088,000	34,542,000
	Total.......	$116,100,700	$40,229,900	$34,316,300	$46,022,000	$11,443,400	$4,353,700	$252,466,000	$309,174,600	$343,527,300

[1] Interest at 4% compounded annually, computed only in proportion to value of land remaining unimproved at the end of each year.

TABLE XIV. — BOROUGH OF QUEENS. LAND VALUES, 1906–21

Costs as percentages of values in 1921

Ward		Land value in 1906	Taxes	Special assessments	Interest on value	Interest on taxes	Interest on assessments	Total carrying charge	Land value in 1921
1	Long Island City	42.7	12.3	15.9	17.6	3.4	3.1	95.0	100.0
2	Newtown	29.0	11.5	15.8	12.5	3.2	1.5	73.5	100.0
3	Flushing	32.1	11.6	1.9	11.8	3.5	.2	61.1	100.0
4	Jamaica	32.0	13.1	7.8	13.4	3.8	.5	70.6	100.0
5	Rockaway	32.3	7.5	.3	8.4	2.0	....	50.5	100.0
	Total..........	33.8	11.7	10.0	13.4	3.3	1.3	73.5	100.0
	Costs as percentages of value in 1906								
1	Long Island City	100.0	28.7	37.2	41.1	7.9	7.2	222.1	234.0
2	Newtown	100.0	39.9	54.5	43.2	11.0	5.2	253.8	345.3
3	Flushing	100.0	36.3	5.9	36.8	10.9	.6	190.5	311.7
4	Jamaica	100.0	40.9	24.2	41.8	11.9	1.7	220.5	312.7
5	Rockaway	100.0	23.2	1.0	26.0	6.3	.1	156.6	309.5
	Total..........	100.0	34.6	29.6	39.6	9.9	3.8	217.5	295.9

has more than doubled in value while the land value of the whole borough has increased only 44 per cent. The carrying charges on vacant land, however, have very nearly equaled the whole increase in value. This section was largely developed during these years and the special assessments were therefore high, and there was a larger proportion of vacant land than in the older sections of the borough.

TABLE XV. — BOROUGH OF BROOKLYN

Tax Sections 15, 16, 17, 18, 19, 20, 23, 24 — 1906–21

	Amount	Per cent of 1921 value	Per cent of 1906 value
Land values, 1906	$94,090,000	45.9	100.0
Taxes paid on vacant land	22,923,000	11.2	24.4
Special assessments	27,777,000	13.5	29.5
Interest on 1906 value [1]	34,699,000	16.9	36.9
Interest on taxes [1]	6,029,000	2.9	6.4
Interest on special assessments [1]	5,519,000	2.7	5.9
Total cost	191,037,000	93.1	202.1
Assessed valuation in 1921	194,970,000	95.0	207.1
Land value, 1921	205,170,000	100.0	218.1

[1] Interest at 4% compounded annually, computed only in proportion to value of land remaining unimproved at the end of each year.

In the city as a whole land values have increased only 15.2 per cent over the value in 1906. Even allowing for a possible error of 5 per cent in the estimates of value for 1921, the increase in land value in Greater New York in sixteen years is not more than 20 per cent, or about 1 per cent a year. This rate of increase is far below the average rate of increase during the nineteenth century. The tax valuations of all real estate in four out of the five counties now included in New York City, were in 1800: New York (Manhattan), $18,696,270; Kings (Brooklyn), $1,864,292; Queens, $3,721,923, and Richmond, $587,928. This would indicate a land value in Manhattan of from $20,000,000 to $30,000,000. In 1850 the assessed valuation in New

York County was $207,000,000, indicating a land value of about $250,000,000. In 1900 the valuation was $2,370,000,000, indicating a land value of between two and two and a half billion dollars. These increases are equivalent to an average annual increase in land values of about 5 per cent a year. In Brooklyn, the average rate of increase from 1800 to 1900 was more than 6 per cent, while in Queens and Richmond the increases averaged about 4½ per cent a year.

After this century and more of rapidly increasing land values, a sixteen-year period of practically stationary values, with but slight fluctuation from year to year, would appear to indicate some fundamental change in economic conditions. The explanation may perhaps be found in the greatly increased demands of the city in the form of taxes and special assessments. Special assessments are usually levied to pay for necessary permanent improvements which add directly to the use value of the land, but these improvements are now so expensive that they do not always add the amount of their cost to the speculative value of the land. Taxes as we have previously noted are relatively almost six times as heavy as in 1860, having risen from 0.50 per cent prior to that year to 2.77 per cent in 1921. Even as recently as 1906 the rate was only 1.12 per cent of the full value. If this additional tax is taken out of the economic rent of the land it is reasonable to assume that the new value of the land will be the capitalized value of the economic rent which still remains to the owner. Assuming an interest rate of 5 per cent, the capitalized value of the $38,500,000 yield of Manhattan land taxes in 1906 would be $770,000,000. Adding this to the estimated land value in that year ($3,400,000,000) we have $4,170,000,000 as the land value in Manhattan in 1906 if no land taxes had been imposed. Similarly, in

1921, the yield of the land tax was $91,400,000. This sum capitalized at 5 per cent is $1,828,000,000. Adding this to $3,468,000,000, the estimated value of the land in 1921, we have $5,296,000,000 as the untaxed land value in 1921. In other words if no land taxes had been imposed land values in Manhattan, instead of remaining stationary, would have increased $1,126,000,000 or 25 per cent in sixteen years. For all boroughs the untaxed value increases would have been from $5,500,000,000 to $7,900,000,000 or 44 per cent. There are probably other factors which have also operated to lower the rate of increase in New York land values. The rate of population increase which was 40 per cent in the decade 1890–1900 was only 18 per cent in the decade 1910–20. With the improvements in transportation facilities the area available for development has vastly increased so that there is no longer the same necessity for concentration in population and economic activity as in the nineteenth century. On the other hand, the great increases in gross rentals may within a comparatively short time bring about a general increase in land values.

In all the foregoing discussions the matter of the changing general price level has been intentionally ignored. In the original computations, however, an attempt was made to reduce all the figures to the price level of 1913 in accordance with the United States Department of Labor index number of wholesale prices. In the computations covering a long period of years taking the carrying charges of each year at the 1913 price level and reducing the value in 1921 in the same manner, the total carrying charges were greatly increased and the 1921 value decreased, thus making the losses of the individual property owners far greater than in the unweighted computation. In the shorter computations, however, the total carrying charge figures were usually slightly decreased on account of the larger proportion of annual charges paid during the period of higher prices.

CONCLUSIONS

1. A large part, and in some cases, all of the increase in the value of vacant land is offset by actual payments to the city in the form of taxes and special assessments with interest thereon.
2. These charges have increased rapidly within recent years, and at the same time the rate of increase in land values has fallen.
3. The holding of vacant land is not a profitable form of investment, except for short periods of time in exceptionally favorable locations.
4. Purchasers of outlying vacant lots at public auction almost invariably pay prices which discount future increases in value for many years to come, and leave to the purchaser a practical certainty of heavy loss.
5. While vacant land makes a substantial contribution to the revenue of the city there are certain elements of social loss in the premature subdivision of land.
    - (*a*) Through the aggregate losses of individual small purchasers.
    - (*b*) Through the loss of interest on the value of street improvements prematurely made and the loss due to their deterioration as a result of disuse and neglect.
    - (*c*) Through the premature withdrawal of land from agricultural use. This loss is, however, relatively slight, and is to some extent counter-

balanced by the frequent use of vacant lots for gardening purposes.

6. If land in favorable locations is so well improved that all carrying charges, including interest and full amortization of buildings, are paid out of rents, any increment of land value added by social growth is a net profit to the owner. The extent to which urban property yields such a profit is a question about which there is much difference of opinion. Since this study was concerned primarily with vacant land, a separate investigation would be necessary to determine the relationship between the increment of land value and the surplus of income, if any, over carrying charges, including amortization.

G. B. L. ARNER.

A THEORY OF THE RATE OF WAGES

SUMMARY

Other theories of wages deal with other problems than that of raising wages, 581. — Sources from which increase of nominal wages may come, 585. — How may the laborers command a share of these surpluses? 605. — Increasing real wages by lowering the prices of what the laborer buys, 608. — The laborer's free income, 609. — Factors determining a wage rate in a given industry, 610.

I. THE inquiry, whose imperfect results find expression below,[1] has had three objects.

(*A*) The first is to find a theory of wages relevant to the problem of how real wages are to be raised.

(*B*) The second is to push the explanation of wages beyond the composite abstractions of current theories and to formulate it in terms of economic factors amenable to control.

(*C*) The third is to establish a theoretical basis for quantitative inquiries into the possibilities of raising wages in particular industries and occupations.

II. The excuse for adding another to innumerable theories of wages is the conventional one that they do not achieve these desired objects.

(*A*) These theories, one and all, have their roots in other problems than that of raising real wages.

1. The "iron law of wages" is an outgrowth of concern with the problems of "misery" and of "poverty." It proves that they are inevitable.

2. The "wages fund" theory is a denial of the ability of trade unions to raise the general rate of wages.

---

[1] The argument which follows is presented in memorandum form because of the tentative character of its statement, the interminable length to which it would otherwise run, and the ease with which this form of composition lends itself to concise and articulate expression.

3. The "exploitation" theory is an attempt to find a philosophical justification for the claim of labor to "the whole of the product of industry."

4. The "productivity" theory is, on its surface, a statement that in distribution laborers receive all that labor produces. Under analysis it becomes an argument that, in buying labor and selling its product, the employer cannot appropriate an "unearned" surplus produced by labor. It is a "non-exploitation" theory of wages.

(*B*) The terms in which these theories are stated render them irrelevant to the problem of how real wages can be raised.[2]

1. All of them, as ordinarily stated, carry ethical implications favorable, or antagonistic, to the prevailing economic order.

2. Their final terms, e. g., "a wages fund," "supply and demand," "specific productivity," carry with them an implication of the inevitability of wage rates established under the action of the assumed factors. They make the theory of wages almost an aspect of natural law.

3. Their final terms are complexes of many specific factors, much too conglomerate to be useful for purposes of control. A theory, adequate to the purpose, must get back of these general terms to the particular factors which are their elements. So far as these abstractions are resolved by their authors, the only sources of wage increases which emerge are the efficiency of labor, the savings of thrift, and the check upon the growth of population. Not only is this list too scanty to be suggestive, but it omits the sources of wage increases most responsive to control.

---

[2] It is, of course, unnecessary in this inquiry to raise the question of the truth or falsity of these theories.

4. They make the theory of wages an aspect of value theory. This leaves out of account items of income, such as compensation for accidents, supervision of health, and educational opportunities, which are no part of the pecuniary wage. Moreover, it directs attention to the process through which labor is evaluated in the market rather than to the relationship of real wages to the tangible sources of wealth.

(*C*) These theories furnish no basis for quantitative inquiries concerned with the possibilities of raising wages in particular industries. On the contrary, they are quite self-sufficient. They require no resolution into parts, no elaboration, no changes in factors or in emphasis, and no qualification to be applicable to specific wage problems. In short they are irrelevant to the problem of a conscious attempt to raise wages by a control of the factors upon which wages depend.

III. This approach to the theory of wages carries with it its own assumptions and method. Since these peculiarities are explicit in the pages which follow, no detailed presentation of them is necessary. It is enough to indicate here the salient features of the problem with which the theorizing below is concerned.

(*A*) Its end is the elaboration of a theory of wages, at once scientific in basis and positive in character, yet relevant to the various problems involved in increasing the particular rates which make up "the wages structure."

(*B*) Its concern is to formulate *a* theory, not *the* theory, of wages. The theory elaborated below is directly relevant only to the problem of how real wages are to be raised. It has no direct relevancy to an explanation of wage rates in terms of native ability; the differentials in wage rates, with a lifetime as the term, paid in various occupations; the ethical merits of "the wages system," incomes from property, or "capitalism"; or many other problems relating to wages. Each of these requires its own theoretical attack. Since there is no single problem of wages, there can be no exclusive "theory of wages" and no one "law of wages."

(*C*) It assumes that wage rates are constantly being redetermined in a developing industrial system, in which the efficiency of labor, the ability of management, the arrangement of work, the technique of production, the organization of units into an industry, and the conventions under which business is being done, are all undergoing change and are responsive to conscious modification. This makes of the rates which constitute "the wages structure" variables in an economic system whose institutions are all variables.

(*D*) It differs from the older theories in attempting to reduce to reality, with a degree of specific detail which it is hoped is not incompatible with theoretical discussion, the conglomeration of variables which in their several degrees affect the rate of wages.

(*E*) Its point of attack is the problem of raising wages. An elevation in the rates which make up "the wages structure" (or, if you must have it so, of "the general rate of wages") can be effected only by an advancement of particular rates in the different occupations and industries.

(*F*) The advancement of a specific rate of wages means the addition of an increment to the prevailing one. Hence this inquiry must begin with a consideration of the conditions under which a rate of wages in a particular industry or occupation can be increased.

(*G*) With this problem of how an increment can be added to a prevailing rate of wages the four sections of the argument which immediately follow are concerned. This can be effected by (1) an increase in the nominal rate of wages (IV–V); (2) an increase in the purchasing power of the nominal wage (VI); or (3) an increase in the goods and services available to the laborer which are not included in the nominal wage.[3] The factors upon which each of these depends are set forth in detail below.[4]

(*H*) There follows a translation of the theory of the increment into a theory of the rate of wages (VIII), a consideration of the relationship of rates of wages to each other in "the wages structure" or through "the general rate of wages" (IX), and some suggestions about wages policy which are implicit in the theoretical discussion which is the main concern of this inquiry (X).

IV. An increase in the nominal rate of wages in an industry or occupation depends upon (1) the discovery of a source for the increment and (2) the ability of the wage-earners in the industry or occupation to command it against the competition of other groups. This section is concerned with the first of these two conditions.[5]

(*A*) The first general source of an increase in the nominal wage is to be found in price changes.

---

[3] Logically this discussion should occupy a single section of the argument. But to simplify what is at best an elaborate explanation, each of these possible sources is discussed in a single section (IV–V, VI, VII). For the same reason the first is divided between two sections, concerned with the possible sources of an increase in the nominal wage (IV) and with the ability of wage earners to command these increments (V).

[4] A summary of these factors seems unnecessary here. The reader who wishes to get a perspective of the argument in advance has only to read first the main headings (IV–VII), then the first sub-headings under each (A, B, C), etc.

[5] This section is very roughly an abstraction of the suggestions of sources of a wage increase for coal miners presented by various witnesses to the Coal Industry Commission (British) in 1919. This represents the most persistent and most comprehensive attempt with which the writer is acquainted to canvass the whole range of possibilities of wage increases offered by an industry. It is proper to defend the members of the Commission and its witnesses by saying that their sources of wage increases were all embodied in "practical" proposals and that none of them had the hardihood to elaborate a theory of an increment in the rate of wages or to convert this into a general explanation of a basic rate in an industry or occupation. In their defense it must also be recorded that in the process of abstraction many sources have crept into this account which were not suggested before the commission. The liberties taken by the writer will be familiar to all who have studied the testimony taken by the Commission. Others are referred to the two million words of testimony "humbly submitted" "to Your Majesty's most gracious consideration" and duly recorded in the Reports and Minutes of Evidence of the Inquiry conducted by the Coal Industry Commission, London, 1919.

1. The cost of the increment in the wage may be thrown upon the consumer. This alternative is subject to these limitations:

(*a*) It is limited by the demand for the good. It is almost impossible to find a good for which the demand is inelastic. A considerable portion of the supply of even the most necessary commodities is put to quite dispensable uses.

(*b*) In some cases the cost of the increase can be thrown upon either the foreign or the domestic consumer to the exclusion of the other. If there is keen foreign competition, a tariff can be made to throw the burden upon the domestic consumer. If a country has a practical monopoly of the industry, within limits the foreigner can be made to bear the cost.

(*c*) If a single good is sold to the public in many varieties, as, e. g., under the device of "class price," the increment may be collected from the consumer of the more expensive (or, if you prefer, the less expensive) brands.

(*d*) The policy of raising wages by passing the burden along to the consumer is likely to be at least partially self-defeating. If generally employed it can raise wages only by the aggregate of the sum collected through the excess in price from consumers who are not laborers.

2. The cost of the increment in the wage may be taken out of the investments in industrial equipment in the industry. This alternative has also its peculiar limitations.

(*a*) The amount available for wage increases has its outside limit in the volume of dividends and profits. While in some industries, or at least in some industries at some times, there is a considerable volume of profits, in general profits are too small in volume compared with the wages bill materially to increase wages.

(*b*) Pressure upon property incomes is likely to yield substantial returns only in industries which have recently become monopolistic and in which property rights to surplus income have not yet become clearly established.

(*c*) Profits from capitalization not represented by physical property offer an uncertain source for wage increases. It is difficult, if not impossible, to disentangle such equities from those that represent real property. In most cases such equities are "established" and have been transferred in genuine sales many times.

(*d*) The lowering of the general rate of interest offers the possibility of a slight increase in wages. This is contingent upon an increase in the volume of savings, a more plentiful supply of credit, or changes in the banking customs and investment habits of the community. It is beyond the control of the laborers in a particular industry.

(*e*) Pressure upon profits is even more narrowly limited by the demand of the industry for more funds. If the increase in wages is to be maintained, either profits must not be so seriously curtailed as to make it difficult for the establishment or industry to attract investments, or some new method, other than dependence upon private investors and "the money market," must be found to secure funds for expansion.

(*f*) Pressure upon profits must not be allowed to deplete the surplus from "corporate savings" intended for reïnvestment in the industry.

3. The cost of the increment in the wage may be taken out of incomes from the ownership of "natural elements" used in the industry. It is argued that since ground rent, mineral rights, and the like are paid for the use of non-producible goods, a reduction or an

abolition of such incomes carries with it no threat to industry. The limitations here seem to be these.

(*a*) The ownership of such rights are tangled up with the ownership of plant, equipment, "good will," and the general equities of the properties within the industry.

(*b*) The total of such incomes, when disentangled from those accruing from investments in reproducible goods, is small in most industries. Even mineral royalties are small in volume in comparison with the wages bill.

(*c*) In most cases "natural elements" used in industry are subject to alternative uses. Under the prevailing system this fixes a definite limit to their appropriation for the payment of wages.

(*d*) Even as regards minerals, so long as mines differ from each other in productivity or location, some form of unification of the industry is necessary to an appropriation of royalty charges.

(*e*) Substantial gains from this source are dependent upon a willingness of the public to make, or to sanction when made under the pressure of wage earners, changes in "the competitive organization of industry" and a revocation of property rights in "natural elements."

4. The cost of the increment may be taken out of salaries paid in the industry. Here there are three possible sources of waste, each offering its peculiar resistance to an attempt at its appropriation.

(*a*) The first is salaries paid for duties which are nominal. The total saving from the elimination of all sinecures would be very small in comparison with the wages bill for an industry.

(*b*) The second is salaries paid for the performance of functions which while now real enough would be unnecessary under a different organization of the industry. The possible savings from this source are not primarily from price changes. They are contingent upon a reorganization of the industry which will be discussed in its proper place below (IV, *C*).

(*c*) The third is salaries in excess of the amounts necessary to adequate performance of functions. It is true that at present many salaries are more than enough to furnish to their recipients incentives to do their best and to supply them with all the instrumentalities essential to efficient work. Yet, under a system in which industries compete for executives and salaries are regarded as indications of efficiency, a single industry cannot immediately cut from salaries their excesses without danger of weakening its personnel.

5. The cost of the increase in the wage may be thrown back upon those from whom the industry receives its materials and supplies. This possibility presents an alternative.

(*a*) It may involve finding the source of the lower prices, in part or in whole, in the wages bills of the supplying industries. This is tantamount to raising wages in an industry at the expense of wages in the industries from which it draws its supplies.

(*b*) Or it may involve finding the source of the lower prices in internal economies in the supplying industries. This is raising for these industries the identical question of a wage increase through internal economies which is discussed for the industry in question below (IV, *B*).[6]

(*B*) The second source of an increase in the nominal wage is an improvement in "the state of the industrial arts." This can be effected either through a development of the arts or through their better utilization.

---

[6] Incidentally one cannot escape the question of why savings found through internal economies in the supplying industries should not be used to raise wages in the industries in which they originate rather than be diverted to raising wages in an alien industry.

Either will result in the production of the current output at a cheaper aggregate cost or in the production of a larger output at the current aggregate cost. The importance of the surplus accumulated through an improvement in the industrial arts as a possible source of increased wages [7] justifies a somewhat detailed analysis.

1. A surplus may be created by increasing the efficiency of labor. It would be tedious to enumerate the various devices and methods by which this might be effected. All that can be done here is to suggest the principal avenues of attack upon the problem and to suggest the limitations to which each is subject.

(*a*) A source of such increased efficiency is an improvement in physique and in health. This involves a progressive attack upon the problems of adequate nutrition during immaturity, a proper subsistence wage, an effective regulation of health, and a prevention of a premature using up of human resources. The solution of these problems is arrested by the ignorance of the great mass of people, by the short-term contract which prevents the employer from considering his laborers as a long-time asset, and by inherited individualistic notions hostile to a program for the conservation of human resources.

(*b*) A second source of such increased efficiency is an improvement in the training and placing of laborers. This involves the problems of general and vocational education; the distribution of laborers among the several industries and occupations; and the placing, training, and promotion of laborers within the business establishment. Such promises of increased personal efficiency are quite finite. Where the machine technique is established the great majority of tasks make use of only a fraction of the laborer's intellectual resources; the training for the task is short and simple; and there is a tendency to reduce men to a dead level. In addition the hierarchical organization of business reduces greatly the number of positions requiring intelligence and discretion.

---

[7] It is significant that the industrial community has no theory of how the new wealth created by the development of the industrial and economic arts is to be distributed. The shreds of such a theory exhibited in the patent system, private property, pecuniary competition, and like institutions, were formulated, so far as they were consciously formulated, without any clear conception of the problem of disposing of future and unearned income made available by the "progress" of the arts. Needless to say such wealth is all appropriated as it accrues but its appropriation bears evidence of no conscious social design.

(*c*) A third source of such increased efficiency is to be found in the better utilization of labor. Here belong the familiar problems of hours of work, rest periods, inspection, "efficiency systems," methods of wage payment, and the like.

(*d*) A fourth source of such increased efficiency is a reduction of absenteeism. This problem is largely one of health and of morale. A serious decrease in the volume of voluntary abstinence from employment must wait upon changes in personal habits.

(*e*) A fifth source of such increased efficiency is an improvement in the morale of labor. In this country the morale of labor is already high. How high it is is evident in noting the fall in wages and the general economic ruin which would attend any widespread practice of sabotage. There is, however, too much of a negative element in labor morale. The industrial system both helps and hinders the solution of this problem. Where industry is mechanicalized, the machine sets the pace. There, except for absenteeism, a high morale on the part of the worker is unnecessary. Where the older "indiscipline" remains, the separation of owner and laborer and the impersonality of management create psychological conditions which undermine morale. This mental distrust is increased by a price system and an irregularity in industrial activity which makes the dependence of wages upon the exertions of laborers an abstraction very hard for them to grasp.

2. A surplus may be provided by increasing the efficiency of management. The importance of this problem may be indicated by visualizing two industrial systems alike in every respect save that one is manned by a first-class and the other by a third-class personnel. The problem is much too complex even to be outlined here. All that can be done is to mention the principal questions which make it up.

(*a*) There is, most important of all, the question of selecting personnel. The method of "trial and error" used in business and that of "formal competence" employed in civil service alike fall short of guaranteeing rational selection. Since positions differ in function with difference in rank, seniority, even when accompanied by attested competence in the position below, is no test of fitness for the higher position. If a real improvement in the choice of personnel is to be made, standards of efficiency for particular positions might be formulated and their incumbents might be chosen in terms of their abilities to meet these standards.

(*b*) There is, next, the problem of eliminating "marginal managements," groups of administrators in charge of establishments that barely remain "going concerns." The facts about the influence exerted upon the rate of wages for a whole industry by incompetent management of poor establishments are too well known to require recapitulation here.

(*c*) There is, finally, the problem of enlisting the full services of the management in the conduct of the industry. To some extent this is a question of devotion to the task to be done. It is even more a question of engaging managers in the service of their establishments as instruments of production rather than as businesses primarily to be run for the benefit of themselves and their stockholders.

3. A surplus may be produced by improving the technique of the industry. In the last century the development of the machine technique has been a factor of great importance in raising wages. In spite of this it is usually overlooked by those concerned with finding a source for increased wages. It is neglected because as a long-time factor it does not possess the immediacy which wage earners demand of their weapons and because it has not usually been regarded as subject to control. Its importance prompts the following cursory suggestions.

(*a*) The accepted theory, common to economics and to law, is that improvements in the industrial arts come from very gifted individuals; that pecuniary rewards are the bait necessary to get from them their pioneer work; and that through a grant of patent the inventor or discoverer enjoys for a period of years the rewards of his industry and genius. At the expiration of the patent the discovery or invention becomes public property, and, through the competition of rival producers, its full benefit is secured to the consumers in cheaper goods.

(*b*) The progress of the work of discovery and invention tend to make this theory more and more obsolete. At present the development of technique in many industries is entrusted to organizations with semi-permanent staffs, whose members work for salaries. This more efficient system is being extended and is capable of application to all industries. Under it the cost of inventions and discoveries can be reduced to almost calculable terms. Wherever it is used the expense incurred in the advancement of technique is only a fraction of the gains which newer methods and contrivances make possible. After all the costs are met, there remains a surplus ("unearned," if you will) for someone to claim.

(*c*) Our industrial community has no definite policy for the disposition of this surplus. A legal claim to it, which is merely immediate and nominal, resides in the owners of the patents. When the surplus actually accumulates, it may go to the stockholders in increased profits, to the consumers in lower prices, to the laborers in higher wages, or it may help subsidize less economical methods which the growth of competitive business seems to make necessary. It is of note that the surplus from technique not yet developed but assured by a competent research organization exists in the future and is now unclaimed. In such gains there are as yet no "vested interests." If wage earners are willing to wait, they have here a source of a constantly increasing wage.

(*d*) The discovery of "natural resources" as a source of wage increases must not be overlooked. The "gifts of nature to production" are not fixed and definite physical properties; their discovery and utilization are intimately associated with the advance of technique. In fact the appearance of new resources and of less wasteful methods of utilizing old ones are among the most important gifts of technique to production.

4. A surplus may be built up by an increase in the quantity or an improvement in the character of industrial equipment. The size of this surplus depends upon two factors.

(*a*) One is the rapidity with which the establishments in an industry can (with all due regard to the costs of obsolescence and replacement) install new equipment embodying the latest technique. Improved machines usually cost little if any more than the less efficient ones they replace. The accruing surplus represents one of the least impervious points of attack for a raise in wages.

(*b*) The other is the possibility of bringing the equipment of the poorer establishments of an industry up to the standards set by the best. It is well known that wages in an industry are affected by "the ability to pay" on the part of the poorer establishments. It is evident that poor equipment increases the cost of production and diminishes the ability of the establishments to pay. In such cases an increase in wages is, among other things, dependent upon a competitive system provident enough to deny business life to the poorer establishments. In marginal plants that survive an elimination of poor and obsolete equipment would remove a serious check on wages.

5. A surplus may have its source in an improved organization within the establishments making up the industry. The possibilities here are as comprehensive as the whole domain of the administration and management of a plant. Some of the larger of the prospective sources of gain follow.

(*a*) The "established order" of nearly every plant can be greatly improved. There are possibilities of a reduction in costs in a closer articulation of the parts of the business, in avoiding duplication of functions, in planning systematically for the future, in careful preparation for the day's work, in proper correlation with other industries, and in an adequate system of accountancy and budgeting.

(*b*) Little progress has yet been made in the establishment of standards by which the efficiency of managements, departments, and employees can be tested. Business practice is still based upon the notion that pecuniary reward is the exclusive bait to efficiency.

Yet as industry is at present organized the nexus of industrial efficiency with pecuniary success is far from complete as repects managements, departments, and employees. In view of this "administrative standards" might be set up for testing the efficiency of management; standards of accomplishment might be established to measure the efficiency of departments; and "production standards" might be formulated to determine the efficiency of labor. The development of such standards will in two distinct ways tend to create an expanding surplus. They will replace the nominal pecuniary incentives of business with real ones. They will reveal the current status of efficiency and by analysis point out possible improvements.

(C) The third general source of an increase in the nominal wage is an improvement in the economic arts. This can be effected either through their development or through their better utilization. So little is the notion that economic arrangements are man-made understood that the idea of a development of economic institutions by conscious and scientific methods is far from being universally held. For that reason the discussion below of six typical problems[8] which fall into this grouping is more protracted than otherwise it need be. Whatever be the solutions of these problems their very presence indicates how important are the arrangements which make up the economic order as factors in determining wages.

1. A considerable surplus might be created by eliminating or reducing the violent rhythm of industrial activity which accompanies "the business cycle." The attendant irregularities in the operation of an industry

---

[8] A consideration of the nature of the unit for the measurement of pecuniary values is a seventh problem. It is discussed below in connection with the argument about increasing the purchasing power of the nominal wage (VI, *D*).

present a serious defect in economic organization. An adequate solution of this problem involves almost every economic institution. It raises the whole question of the efficiency of industry under business guidance. It is, therefore, too all inclusive to be discussed as a subhead of a theory of wages. It is sufficient to indicate two ways in which the operation of the economic cycle holds wages down.

(*a*) The first and most obvious is the creation of unemployment in periods of depression. Even tho nominal wage rates are maintained, the depletion of earnings seriously impairs the wage rate measured in a period long enough to be of any significance in the life of the laborer. Furthermore, these stoppages of income, by decreasing the purchasing power of a part of the community, indirectly lower the wages of those constantly employed.[9]

(*b*) The second is an increase in the cost of production per unit of product. In periods of depression overhead costs, which are fairly constant, are spread very thick over the small volume of production. In periods of prosperity increased demand is accompanied by increases in costs, since raw materials have to be bought at advanced prices and plants are forced beyond their normal capacities. A reduction in these costs through more regular production would create an appreciable surplus.

2. If wage earners would take thought for the mor-

---

[9] At this point the writer cannot forbear making a single suggestion. It is that a tax, as heavy as the traffic can bear, be placed upon temporal irregularities in the volume of employment. It may perchance be that this will not arrest cyclical unemployment, for its sources are beyond the control of the personnel of any industry. But if there is any truth in the theory that pecuniary rewards are among the motives to industrial policy, which even the most protestant of economists does not deny, it will cause business executives to do all they can to regularise the volumes of their respective employments. Since the receipts would be paid out in unemployment benefits, this would also tend to decrease unemployment by stabilising purchasing power. Thus it would provide a double incentive to the reduction of unemployment.

row a considerable saving might be effected in the costs of the services of property. An industry should pay no more than necessary to secure investments. It is a matter of convention that the services of executives and of employees are rewarded with terminable incomes and the services of investors with indeterminate ones. If the services of the investor, which are finite, were rewarded with the guarantee of an income for a definite period of time, the cost of his investment would terminate at the end of this period. In this way the burden of ownership upon an industry might eventually be materially reduced or eliminated altogether. Two illustrations will make this clear.

(*a*) It is a common practice for establishments to build up surpluses through "corporate savings." These are invested in "additions" and "betterments." This practice is capable of extension. In fact it might come to be the general custom of securing funds for the expansion of established businesses. Such surpluses represent earnings in excess of the payments necessary to attract investments. It is possible to take away the conventional right of the security holder to claim such reinvestments as property upon which he is entitled to an income. It is also possible to collect interest upon these reinvestments from the consumers in higher prices. This makes possible a small, but gradually increasing surplus, available for the payment of higher wages. It would amount to a capitalization of corporate savings as a property right of the laborers in the industry.

(*b*) It is possible at the end of a period of, say, fifty years, to free an industry from the whole of the ownership charge. This can be effected without the slightest impairment of any existing property rights by the simple device of replacing indeterminate or renewable securities with annuities of an equal market value terminating at the end of fifty years. In this way a very large surplus could be created.[1]

3. A reorganization of the system of marketing the products of an industry offers the chance for a surplus. There is a persistent demand for a simplification of the prevailing "hierarchical system of distribution" of goods, with its ranks of jobbers, wholesalers, retailers, and whatnots. The obstacles in the way of market reform are two.

(*a*) There are in the marketing organization vested interests which have no thirst for extinction.

(*b*) There are necessary functions in the process of marketing goods, such as transfer, storage, delivery, and the extension of personal credit, which are essential under any form of market organization, and which require agencies for their discharge.

4. There is a demand for a larger measure of unification in an industry. Many proposals of partial unification have been made by individuals and by groups who have zealously sought a fund available for raising wages. The following are the more important of these.

(*a*) There is, first, the demand for "collective marketing." A very large part of the cost of marketing is incidental to the sale of the particular brands of competitive establishments rather than essential to the marketing of the product itself. In particular the demand for stable commodities is quite constant and selling costs are largely competitive. In this country law has recently sanctioned the establishment by competing firms of a single agency for exploiting the foreign market. Of late there has been much ado over proposals of similar organizations for domestic marketing. If this could be effected, under proper control, substantial economies might be realized.[2]

---

[1] Here arises the question of the equity of the conflicting claims of the laborers within an industry and the consumers of its products to the income freed by the non-capitalization of "corporate savings" and by "the liquidation of ownership." It is of no concern here only to note that the issue is between concentrating the surplus upon a substantial increase in wages in an industry or diffusing it in slightly raising the wages of all laborers through a decrease in prices. Of course in the improbable event of all industries expanding through the reinvestment of non-capitalised corporate savings and all of them liquidating ownership at the same time there would be little material difference between the results of these two policies upon the "wages structure."

(*b*) There is, second, the demand for "collective research" in technique. It is proposed that the competing firms in an industry unite in maintaining an organization for the development of technique, the establishment of standards of technical performance, and the like. Technique is not developed as rapidly by competing firms as it could be by an institution supported by all of them. The inability of the weaker firms to maintain research organizations is a serious check upon their "ability to pay" wages. This proposal seems very promising. Yet obstacles to its realization exist in the spirit of business enterprise, the public distrust of monopoly, and the attitude of the courts.

(*c*) There is, third, the proposal of a "wages pool." The object of this is to divorce the rate of wages from "the ability to pay" of the individual firm and to make it dependent upon "the ability to pay" of the industry as a whole. Its advocates would guarantee to all laborers in an industry a fixed rate of wages; they would have this paid out of a "pool" maintained for the industry as a whole; and they would require individual corporations to contribute to the "pool" in accordance with some predetermined principle, say, so much for every unit of product. By thus making wages a "first charge" against the industry, an increased regularity and stability would be given to the wage rate.[3] Yet it is hard to see how this could add more than a small increment to wages unless the price of the commodity were raised or contributions were made to the "pool" out of public funds. At best it could only average out the abilities of the several firms to pay. Offhand it appears that it could not increase the aggregate of wages in an industry by more than the differential property incomes paid by the concerns making it up.

---

[2] It is evident that "collective marketing" involves some scheme for the allocation of production among the establishments in an industry. It is hard to see how the result could stop short of giving to an industry a larger measure of unification than bargained for.

[3] A nice problem requiring careful adjustment is presented in making the aggregate of all collections from corporations recurrently equal to the wages bill for the industry.

(*d*) There is, fourth, the proposal of "financial unification." The demand is for a united business management of an industry composed of establishments, each of which retains its technical staff. Its advocates would, as in the case above, have wages charged against the industry, rather than against its separate establishments. Many of them would have prices based upon the average, rather than upon the marginal, cost of production.[4] If the financial guidance were competent, it cannot be argued against the scheme that it is a mere device for collecting a subsidy from efficient establishments to maintain incompetent ones. But there are two serious obstacles in the way of this promising venture. First, at best only the differentials of the better over the poorer establishments could be appropriated. Second, an attempt at their appropriation through "financial unification" would have to be compulsory. If the units composing the industry were left to unite by act of free will, there is no guarantee that the differential gains of the better establishments would be devoted either to raising wages or to lowering prices. If "financial unification" were forced upon them, serious questions of law and of the equity of established incomes from property would be raised. Such questions might be solved; but for the moment their very existence and the vested interests in their remaining unsolved are almost insuperable obstacles to an adoption of the scheme.[5]

---

[4] The advocates of this scheme sometimes forget that if prices are based upon "the average cost of production" the surplus made up of the differentials obtained by basing it upon "the marginal cost" will not be available for paying higher wages. This surplus may be distributed between the wage earners in an industry and the consumers of its products. It cannot be awarded to both of them.

(*e*) There is, fifth, the demand for "collective production." Since "collective production" is impossible without "collective finance," it involves a rather complete unification of the industry. For that reason it is discussed in its proper place just below.

5. More drastic still is the demand for a complete unification of the industry. The rate of wages has, among other antecedents, the prevailing organization of an industry as an aggregation of competing units (modified by some semblance of unity for price-making or other purposes) under business control. Under another form of organization wages might be higher or lower; almost certainly they would not be, collectively and severally, what they are now. The demand for "the organization of an industry" finds expression in an increasing number of proposals. The possibilities of these daring attempts to discover funds available for wage increases are indicated in the following discussion of the three most common proposals.

(*a*) The simplest proposal is "monopoly," the merger of the units of an industry into a single joint-stock company, with a "business organization" and under "private control." This would enable savings incidental to collective marketing, collective research, a wages pool, financial unification, and collective production, to be made. In addition it would permit economies from the careful distribution of establishments within an industry. It is evident that such economies, if realized, could be made to yield a substantial surplus. Yet the proposal is not convincing. While economic opinion is coming to look less favorably upon the beneficence of competition, the superior efficiency of monopoly is still unproved. The distrust of the public for this type of organization is not likely to be allayed until we devise more effective agencies of control than we now possess. Finally we have not yet reached the point in cosmic evolution where those who organize monopolies find their primary incentive in a desire to raise wages.

---

[5] In long-time terms the proposal is more promising. In particular it might be very useful in industries in which production in increased quantity entails higher costs. For an increased demand and a "lower margin of cultivation," utilization, or fabrication would create differentials which might be disbursed in wage increases in the industry. This, of course, would be equivalent to giving to its laborers increased property rights in an industry.

(*b*) A proposal advocated more enthusiastically by those who wish to raise wages is "nationalization." Its advocates claim not only that it will realize all the economies promised by monopoly but that in addition it will provide a solution for the problem of control. In spite of experience with nationalized industries in various countries, the question still remains a speculative one. Of late some work has been done in breaking it up into specific questions about changes in the organization of an industry. Altho this work is very promising, research and experience have not yet reduced it to terms calculable enough for judgment upon the effects upon an industry of so sweeping a change in the form of its organization. When the change is made, it will cut athwart too many habits and usages of the business system to make the surplus inherent in it immediately available.

(*c*) Of late a demand for "worker's control" or for "joint control" has found expression in an increasing number of proposals. It has been suggested that the management of a unified industry be entrusted to the joint control of representatives of owners and workers, of workers and consumers, or to the exclusive control of workers. Its advocates claim for such a scheme all the advantages and freedom from all the disadvantages of monopoly and of nationalization. It is superior to monopoly in that: (1) It will save the morale of labor which under "capitalism" is a "wasting asset"; (2) It will utilize in management the experience and intellectual resources of labor which now go to waste; and (3) It will adequately safeguard the interests of the public. Its merits overtop nationalization in that: (1) It will avoid bureaucracy; and (2) It will through organization in the form of a joint-stock company avoid a radical break with existing institutions and usages. Despite the promise of such schemes, their proposals are too new and too little understood to be fairly weighed against the present system. It is only when analysis, the accumulation of fact, and detailed restatement have reduced these blanket proposals to specific constructive measures that a judgment upon them will be possible. It is, however, more than possible that in the fullness of time (which no one is willing to wait for) economic research may turn these vague proposals into an acceptable program for accumulating surpluses available for wage increases.

6. This suggests a proposal of a far more scientific and a far more revolutionary kind. It is that there be established institutions for research in economic organization and for the development of the economic arts. Scientific procedure in the development of the industrial arts no longer requires argument. But so prone are we to regard the arrangements which make up the economic order as "natural," or as the deliberate selections or "survivals" of a long process of "trial and error," that we think little of subjecting them to scientific scrutiny. Our economic order was never deliberately contrived. It emerged as the result of the attention given by many

men to the small matters of their own concern. The constant changes which are occurring in it are by-products of attention to particular interests and specific problems. Of late the case for research organizations to accumulate "the facts" about the industrial system has become more convincing. But something more is possible. There might be research organizations with competent personnels who were able and willing to examine proposals for economic change quite disinterestedly. They might by analysis, criticism, the accumulation of fact, and interpretation, translate vague proposals of changes in economic organization into constructive propositions. This they could do without commitments for or against the proposals considered. This would make possible valid judgments upon such matters. It would be a significant step in the substitution of "reform by method" for "reform by agitation." The advance in the state of the industrial arts is coming to rest upon scientific method. The "backwardness of the economic arts" might be overcome by a like attack.

V. The mere existence of these potential surpluses does not automatically raise wages. That result is also contingent upon the ability of the wage earners in an occupation or industry to command them in competition with other groups. Of the many factors affecting the competitive strength or weakness of the group of wage earners in an industry, the following seem to be of the greatest importance.

(*A*) The factor most often stressed is the relative scarcity of laborers who can do the work of the industry. A rapidly increasing native population, a large immigration, a reduction of tasks to routine, an easy admission to an occupation, and kindred factors tend to defeat wage earners in their attempts to appropriate these surpluses. Conversely a static native population, an arrested immigration, a detailed differentiation of tasks, a rigid requirement for admission to a craft, and similar elements tend to aid their struggle. All of these have received adequate attention and require no detailed discussion here.

(*B*) A second factor is the unit used by the laborers for bargaining purposes. If the rate of wages appears in separate contracts between a corporation and each of its employees, the wage earners in an industry will have less power to claim these surpluses than if they act as a unit for bargaining purposes. If the laborers in an industry are organized and the employers are not they will possess far more power over these surpluses than if the employers are organized and they are not. The institution of collective bargaining has received scant attention in reputable economic theory. But it finds adequate expression in the growing body of theory which is being built up incidental to "the labor problem" and requires no detailed formulation here.

(*C*) A third factor is the strategic importance of the industry in which the laborers are engaged. Wage earners in industries of growing importance have a much better chance to appropriate these surpluses than laborers in industries of declining importance. In a developing industrial society there appear periodically occasions upon which an industry of high strategic importance can command additional revenue at the expense of the consumers. If the laborers within the industry have a strategic position, they can divert a large part of this surplus into higher wages. If all industries were to be organized and if laborers in the more strategic industries were to keep their ranks intact against the invasion of laborers from less strategic industries, the pecuniary returns due to the strategic position of these industries in the economic system could be converted into differential wages for the laborers in those industries.[6]

(*D*) A fourth factor is the theory of wages held by those who bargain about wage rates. The importance of this factor is in direct proportion to its general neglect. If the representatives of wage earners in an industry believe that the rate of wages is fixed by a "natural law," resting upon some such ultimate and immutable terms as "demand" and "supply," they have little appreciation of the problem of raising wages. If they conceive of the productivity of labor, the ability of management, the efficiency of technique, and the efficacy of business organization as established institutions, they can make no use of improvements in these institutions in a program for raising wages. If they assume that wages can be raised only by raising prices, they limit themselves to the use of a single device. If they comprehend the many and varied sources from which an increase in wages may come, and if they can make skillful use of devices for tapping these sources, they will be equipped to formulate a comprehensive and progressive program for raising wages. To repeat, one of the most important terms in the theory of wages is beyond peradventure the theory of wages held by those who formally make wage rates.

[6] One of the most interesting questions presented by the possibility of the organization of all industries is the principle of wage payment. It is entirely possible that laborers would be paid, not in accordance with ability, experience, or application, but in keeping with the strategic positions of the industries which they served. Such a situation, however, would not be new. To cite a single example, laborers of equal native gifts and application are rewarded differently because they work under different economic systems or choose to be born in different centuries. In fact such differentials are at least pertinent factors in the explanation of all wage rates. For so long as we talk vaguely about the relationship of wages to ability, skill, and application, but have no standards for testing these qualities (except wages, which involves reasoning in a circle, and a very short one at that) we cannot escape the fear that the current wage structure is full of such differentials. The problem of justice between laborers in different occupations and industries is probably as far from solution with us as it would be under a system in which all industries were organised.

VI. The rate of wages in an industry may remain nominally the same and still be increased if its purchasing power is increased. Winning a nominal wage is only one-half of the process of gaining a living. To complete it the laborer must take his wage to market and exchange it for goods and services. His real wage is as intimately dependent upon the terms of that exchange as it is upon his nominal earnings. Or, more briefly, the prices of commodities are one-half of the problem of wage rates. Only a cursory account of the sources of an increase in real wages through lower prices is possible here.

(*A*) The most obvious source of such an increase in real wages is a decrease in the prices of goods which are means to the laborer's well-being. All of the sources of an increase in the nominal wage enumerated above (IV) are, with the exception of the device of taking the increase out of the consumer (IV, *A*, 1), sources of lower prices. Of particular importance are those which conduce to an increase in the resources of production. All of these surpluses may, instead of being used to raise wages in the industry, be devoted to lowering the price of the commodity to the consumer.

(*B*) The increase in real wages through lower prices may be accentuated by a diversion of productive resources from other uses to an increase in the commodities which are articles of importance in the laborer's budget. In part this can be effected by the elimination from production of waste goods, as, for example, the materials of competitive national armament; and in part by diverting to the production of essential commodities resources now used for the fabrication of luxuries. The latter can be aided by all those measures which tend to a more equal distribution of wealth.

(*C*) The real value of the nominal wage may be appreciably increased by an elimination from the laborer's budget of expenditures whose object is the avoidance of ill-being. The dubious expenditures for curative drugs and medical services and the excess in the insurance rate due to the hazards of the occupation are examples of such expenditures. The development of sanitation, the growth of preventive medicine, and the movement for safety, which tend to decrease such expenditures, add substantial increments to the laborer's income.

(*D*) The real value of the nominal wage might be materially increased if stability were given to its purchasing power. The wants of the laborer's household are regular and recurrent; his income should possess the same characteristics. At present the nominal wage is at the mercy of a vacillating system of prices and a capricious unit for the measurement of market values. A real "stabilized dollar" would be tantamount to a substantial increase in wages.

VII. The laborer's wage falls into two distinct parts. The first is the nominal wage, converted into a real wage through purchases of commodities and services. The second consists of goods and services which, under prescribed conditions, are at the laborer's disposal. There are two sources of this free income, each of which requires passing mention.

(*A*) One is the establishment employing the laborer. Facilities for recreation, the benefits of a health service, and opportunities for industrial training are among the many services offered to an increasing number of laborers by the concerns employing them. Some of these "welfare services" owe their establishment to managements who were convinced that they would pay. Others rest upon the ephemeral basis of attempts to avoid taxes. In such cases the value of the service was regarded as at least equal to the excess in cost over the amount that otherwise would go into taxes. For the future there is every prospect of an increase in the scope and number of such services.[7]

(*B*) The other is the political community of which the laborer is a member. The free use of parks and libraries, free schools for his children, access to a public health service, and doles for unemployment are typical examples of economic services offered by the state to the laborer. Through them the real wages of labor have been materially increased in the last twenty years. These items, too, are among the most important in the laborer's budget. Such increases eventually entail little cost upon the community; for educational opportunities, the supervision of health, and like expenditures will pay for themselves in the next generation. Immediately they do impose a cost and this cost is the most effective limitation upon their extension. Since they are paid for by taxation, which falls only in part upon laborers, they do constitute a net addition to wages. To the extent that such taxation meets the canon of "ability to pay," the smaller is the burden upon laborers and the greater the addition to real wages. An increase in the political power of wage earners argues for an enlargement and extension of such community services in the future.

VIII. This discussion of the sources of an increment in wages leads inevitably to a general theory of the determination of a wage rate in an industry. The initial problem of how real wages can be raised requires the elaboration of such a theory and the discussion above supplies all the material that is needed for it. Such a theory, quite inchoate as it is, is given a tentative statement in the propositions which follow.

(*A*) The sources of an increase in a wage rate are the sources of the basic rate. The argument above has shown the conditions under which a wage rate in an industry can advance. By implication it has also shown why it remains at its present figure. The factors upon which both the higher and the lower rates rest are the same. They differ because of quantitative differences in one, a number, or all of these factors.[8]

---

[7] It is frequently argued that such services do not constitute a net addition to wages, since they are paid for by subtractions from nominal wages. This argument has not been proved and is highly improbable.

(*B*) It is, therefore, possible from the discussion above to list the factors upon which a rate of wages depends.[9] The outline of the principal factors given below can be elaborated to any requisite length from the argument above. The rate of wages in an industry or occupation is dependent upon the following factors.

1. The nominal rate of wages. This rests upon:

(*a*) The position of the industry or occupation as regards (1) the price and cost situation; (2) the state of the industrial arts; and (3) the state of the economic arts. To reduce the formula to manageable terms each of these must be broken up. Thus the state of the industrial arts includes the respective states of labor, management, technique, industrial equipment, and the organization of the plant. Thus the state of the economic arts includes such conventions as the guidance of industry by business, the organization of an industry as a series of competing establishments, the placing of the labor charge against the establishment rather than against the industry as a whole, and the like.

---

[8] The skeptically-minded reader may, for further illustration, work through the problem of a decrement in the wage rate. The lower rate will be found to differ from the current rate because of quantitative differences in the factors mentioned above. The mathematically-minded reader may, if he chooses, state the problem as why in industry R wages are \$M rather than \$M + N a week, or what are the conditions under which wages at present \$M can be increased to \$M + N a week. He may regard the basic rate of wages as composed of a series of increments and follow this up working through the formula again and again, using successively \$M and \$M − N a week, \$M − N and \$M − 2N, \$M − 2N and \$M − 3N, etc. It is only fair, however, to warn the latter that the process through which a wage rate has come to be what it is cannot accurately be represented by the series into which a mathematical entity can be broken up.

[9] Of course the discussion above has not revealed all the factors. To supply those missing and to resolve and reresolve those given into all their detail would be an interminable task. However those mentioned are numerous and typical enough to indicate the nature of the problem.

(*b*) The relative ability of wage earners to command income in competition with other groups.

2. The purchasing power of the wage.

3. The goods and services which fall outside the nominal wage.

(*C*) The specific factors upon which the rate of wages in an industry or occupation rests are customs, habits, practices, institutions, or, if you please, arrangements. Typical examples are the current values set upon natural resources, the state of industrial technique, the practice of absenteeism, and the institution of charging wages up against a corporation rather than against the industry as a unit. Or, to put it differently, the theory here stated is institutional.

(*D*) The wage rate and the factors upon which it rests are all variables.[1] It is subject to a constant process of increment and decrement. The increase accrues because of an increase in one, a number, or all of these factors, or because of an improvement in the bargaining powers of laborers. The decrement appears because of a decrease in one, a number, or all of these factors, or because of a decline in the bargaining power of laborers. The making of the wage is a process; it is constantly being redetermined in terms of the impinging factors.

(*E*) The factors upon which the rate of wages rests are all of them in their respective degrees subject to human control. This characteristic is too important to be passed without a word of comment.

---

[1] The realistic terms of this formula are still so abstract that it is difficult to appreciate even from the above account how variable they are. It is only when one has worked the formula through in terms of a specific industry that he realises their variability. But the doubt is eliminated when, to cite the single example of the British coal industry, these abstractions become laborers too provoked with "private enterprise" to give their best, managers too poorly paid to be efficient if they would, inspectors far too few in number for the task, engines and cages of obsolete patterns, and the sprawling organisation of establishments within the industry.

1. There are limits to the conscious control to which each will respond. The indisposition of consumers to pay is a limit upon wage increases through price advances; the cost of replacement of equipment retards the rate at which technique develops; and the faith of the public in competition arrests economies through the unification of an industry. This is inevitable, since these factors mutually impinge upon each other in a developing industrial system.

2. These factors differ in the nature of the groups to whose control they respond. A single corporation can increase the efficiency of its management; the development of technique can be controlled by an organized industry, but not by the average establishment within it; a change in the form of the organization of an industry involves an appeal to the public. A trade union may raise the nominal rate of wages in an industry, but it is only as a part of a larger consuming public that it can increase the purchasing power of the nominal wage.

3. These factors differ in the immediacy of the returns which control makes possible. The returns from an increase in price are immediate; those from a developing technique slow but cumulative; those from "the liquidation of ownership" more than a generation away.

4. The factors subject to control are limited in number by the attitudes of the groups who can control them. Ignorance of the economic order or a conception of it as part of the world of nature makes intelligent guidance impossible. As the knowledge of economic organization increases and as the institutions which make it up receive detailed attention, there will be an

increase in the number of factors which those who are concerned with wage rates regard as subject to control.

(*F*) If the factors upon which the rate of wages in an industry rests are institutions, if they are variables, and if they are subject to control, there can be no "natural rate of wages." All rates of wages are artificial, tho all are not authoritatively determined.

(*G*) The theory presented here may be called "a functional theory" of the rate of wages. The term means that the rate of wages in an industry or occupation is a function of the pecuniary, technical, and economic factors which impinge upon it. Since these factors vary in quantity from industry to industry the theory is functional rather than numerical.

(*H*) In its most general statement this theory makes the rate of wages a function of all of these impinging factors. In this form it is too long and too complex to be used. This bewildering complexity, however, is lost when the use to which it is to be put is noted. For any wage rate at any particular time certain of these factors will stand out as all-important, others as of less importance, and the rest as of negligible account. In this abridged form it has the selected character of all causal explanations of social phenomena.[2]

(*I*) This theory can be put to use only when its abstractions are converted into the less general terms descriptive of a particular wage rate. The factors enumerated above, and even more their constituent elements, vary from industry to industry and from occupation to occupation. Factors of importance in shaping one wage rate are negligible in their effect upon another. Factors common to many wage rates differ widely in their influence upon these rates. It is only by a reduction of these factors to quantitative terms that this functional theory can be converted into a numerical formula explaining a specific wage.

---

[2] Even such an abridgment will not satisfy those who seek economic verity, who know that a formula to be true must be simple, and who crave truth that can be reduced to italicised principles. Its defense must be that it is specific and realistic enough to be usable.

IX. Thus it is that a wage rate in an industry or occupation is determined. Thus it is that many wage rates in many industries and occupations are being remade. Two questions remain. One is the relationship of wage rates to each other. The other is the relationship of wages to other shares in "distribution."

(*A*) The relationship of wage rates in different industries and occupations provokes contradictory explanations. Many persons mold these wage rates into an orderly and unified structure. To that end they assume as a basis of "the wages structure" "a general rate of wages." Particular rates paid in skilled occupations are thereby compounded from "the general rate of wages" and an occupational or industrial differential. Others regard "the wages structure" as so sprawling and conglomerate that explanation can go no further than the particular rate of wages. A consideration of wages structures in different countries and under different economic systems give evidence that wage rates mutually affect each other. A detailed study of wage statistics in a single country makes one skeptical alike of a basic rate and of well-ordered differentials based upon it. The truth is that there is a tendency towards uniformity throughout "the wages structure" and a tendency towards diversity.[3] The relationship of rates within "the wages structure" is to be explained in terms of these antithetical tendencies.

---

[3] The trouble lies in the assumption, common to both groups, that a "cause" or "tendency" works to the exclusion of its antithesis. Economic causes and tendencies are conceived in absolute, not in relative, terms. The truth is that the economic order is filled with antithetical "causes" and "tendencies." To cite a single example, the relationship of the rates which make up "the wages structure" cannot be explained without the assumptions both of the mobility and the immobility of labor. The question of the extent to which each prevails is one for quantitative determination. Because of this relativity of economic "causes," "tendencies," "forces," and whatnots, economic

1. There is at least the semblance of a tendency towards "a general rate of wages" and well-ordered differentials in "the wages structure." This rests upon the following factors.

(*a*) "Labor" is frequently regarded as a "fund" made up of homogeneous units. This conception makes it a standardized commodity. Accordingly in a market as fluid as modern industrialism offers it will be paid at a uniform rate. Differentials are, therefore, the necessary payments for a quantity in excess of, or a type above, the standard. There is at least a suggestion in the world of reality of "the funding of labor" so glibly achieved in many wage theories. Where the machine has reduced the great mass of tasks to routine one laborer is very nearly as good as another. And immigration has given us a flood of human beings that approach the economic ideal of a standardized, homogeneous, depersonalized "fund of labor."

(*b*) The mobility of labor tends to give order to wage rates. To the extent that laborers flock into the better-paying industries and occupations and avoid those less remunerative, the tendency is towards uniformity in wage rates.

(*c*) The mobility of prices has been frequently regarded as an active agent in equalizing wages in various industries and occupations.

2. In spite of this tendency towards uniformity the rates which make up "the wages structure" tend to diverge. A great many of the factors upon which diversity rests have been revealed in the discussion above.

---

theory can do little more than enumerate the factors upon which the phenomenon to be explained rest. A statement in numerical terms must await the application of the theory to the particular problem. But this is straying from the theory of wages to the theory of economic theory and has no place here.

Some three of the more general of them will be specifically mentioned.

(*a*) "Labor" cannot be reduced to a fund of homogeneous units. The requirements of various tasks are manifold and divergent. The aptitudes and capacities of laborers vary tremendously. Neither the demands of positions nor the abilities of laborers to fill them are capable of being measured in terms of any common unit. Nor, without pressing faith into credulity, can we say that in the adjustment of men and jobs to each other these attributes get properly measured.[4]

(*b*) "Labor" is to a very large extent immobile. Such conventions as the cost of opportunities for special training, commitment to a trade, unwillingness to move, and the inchoate organization of the labor market prevent the laborer from being always free to take the better chance.

(*c*) The trade union, through restrictions upon entrance to a craft and through collective bargaining, can secure for its members differentials which otherwise they would not possess. Such differentials rest rather upon the strategic position of the industry, its "ability to pay," the strength of the trade union, the quality of its leadership, and the skill of its representatives in discovering and tapping sources of wage increases than upon a calculation of the superiority of the work of the group of laborers in question over that of unskilled workmen.

---

[4] The use of the pecuniary unit, of course, begs the question; for if market ratings of laborers vary with their economic worths, some measure of economic worth must exist apart from market valuation. Even if laborers are perfectly free to take or leave whatever jobs they will and employers are as free to hire or to refuse to hire whom they will, it does not follow that the ratings which make up "the wages structure" correspond to those of personal economic worths. The assumptions of a common denominator of human capacities, of the laborer's perfect knowledge of himself and the economic world, of his unadulterated pecuniary rationality, and of the instrumental character of the employer's judgment of economic worth, all necessary to so pleasant a conclusion, are too great a tax upon economic faith for that.

(*B*) The question of the relationship of wages to other shares in "distribution" may be formulated either in specific or in general terms.

1. In specific terms the question is that of the relationship of a particular rate of wages to other incomes derived from an industry. Since a general elevation of wages involves an increase in particular wage rates it is in this form that the question is most relevant to the problem of how real wages are to be raised. In this form it has already been fully discussed in the argument above.

2. In general terms the question is that of the division of the whole of the income of society between laborers and other claimants. As thus stated we must learn a great deal more about how wages, salaries, and the incomes from property in particular industries are determined before we can make an intelligent attack upon the principles underlying the division of the whole economic income between laborers and other sharers in "distribution." For the moment this cosmic question must be left to the surmises and dialectic of the romantic economists.

X. At this point the discussion of the functional theory of the rate of wages properly ends. The discussion above has been limited to an objective statement of the potential sources of an increase in a wage rate, to a theory of how a rate of wages in an industry or an occupation is determined, and to a discussion of the relationship of the various rates in "the wages structure" to each other. But, since the beginning of this inquiry lies in the specific problem of raising real wages, it requires for completion some application of the conclusions reached to the original question. For that reason a few cursory suggestions, all of them clearly implicit in the argument above, may be set down without violence to the positive attitude which the writer has tried to maintain throughout.

(*A*) This inquiry indicates that the prospects of raising wages are very promising. The rate of wages is always a man-made one; the factors upon which it rests are subject to control; the sources from which an increase can come are many and varied. Most of these sources will yield immediately only small amounts in comparison with the total wage bill for an industry. Many of them together can be made to yield substantial additions. More important still, most of these sources promise under proper guidance to yield progressive additions to wages. On the other hand this inquiry gives little comfort to those determined to effect a substantial increase in all wages immediately. It reveals the presence of no coming economic millennium.

(*B*) The number of questions relative to a wages issue is very large. Investigating committees, boards of arbitration, and other parties charged with an immediate determination of wage rates cannot limit their attention to the mere facts about the cost of living, wages paid in competitive establishments, and the superficial showings of the balance sheet. They must take account of a whole range of facts usually regarded as beyond the pale of wages theory and thoroly canvass the potential sources of an increase in wages. It is even more necessary for officers of trade unions, concerned as they are with the formulation of long-time wages policy, to take account of the number and variety of the factors affecting the rate of wages.

(*C*) The factors upon which the wage rate in an industry rests are subject to very different "controls." The trade union as an institution for collective bargaining, the trade union as an organization for the formation of social policy, the professional men who are "experts" in the industrial and economic arts, the mass of consumers, and that mythical personality called "the general public," all have their respective spheres of influence. Each of these has its finite control over a limited number of factors, tho the range of the conscious control of each is larger than is usually supposed. Finally, some of these factors and even more their aggregate, await the development of new instruments of control.

(*D*) In its demands for higher wages "organized labor" cannot be indifferent to the sources from which the increment comes. On grounds alike of equity and of strategy the practice of claiming from the employers higher wages and allowing them to find the surpluses where they will is to be condemned. The alternative of careful attention to sources involves, on the part of the representatives of "organized labor," a knowledge of the industry in its many ramifications, a careful and consciously formulated program, and scrupulous attention that the funds come from the predetermined sources. This involves an increase in the number of factors in industry over which "organized labor" exercises some measure of control and a larger responsibility for the conduct of business that it has been willing to assume in the past.

(*E*) In attempting to raise wages "organized labor" should make a sparing use of the obvious device of putting the burden upon the consumer. In practice this device should be subject to some such restrictions as these.

1. It may properly be used to raise wages in an occupation or industry to a sum adequate to a decent living. This sanction rests upon a classification of "a decent wage" as "a necessary cost of production" and an ethical principle (arbitrarily assumed if you will)

that the consumer of the product of an industry should pay the costs essential to its production.

2. It may properly be used, if the cost of living is advancing, at least to the extent of returning to the nominal wage the purchasing power of which it has been robbed by an advance in prices.

3. While there may be other cases in which its use is warranted, as, for example, to attract into an occupation men possessed of an adequate degree of skill, these should be very few. Every case of this type should be regarded as an exception and should stand upon a positive justification.

4. Its general use is likely to defeat its own object. A single union can raise wages by passing along the burden to the consumer. If all trade unions use this device, the net gains will be smaller than the gross gains, since the members of various unions purchase each others' products. The net gains are likely to come largely from unskilled labor, the group least able to pay. If all laborers, skilled and unskilled, organize and all play this game, the net gains will be limited to the small returns paid in advanced prices by consumers who are not laborers. In an industrial society imperfectly organized this policy may be sound strategically (whatever be its ethical merits) for a single trade union. It is difficult to see how it can command the approval of an organization purporting to represent "all wage earners."

(*F*) A certain source of wage increases is to be found in an improvement of the industrial arts. The technique, organization, and equipment of the great majority of plants in every industry fall below proper standards. The efficiency of labor and of management alike is subject to improvement. Through the elimination of wastes surpluses of unappropriated income can be built up. Other income receivers will seek to appropriate these surpluses. "Organized labor" can set for itself the task of diverting to the payment of higher wages as much of this "free income" as possible. Such gains are all net. They cannot be dissipated through increases in the prices of products.

(*G*) If "organized labor" will adopt a long-time program still more substantial gains are possible. The great difficulty about immediate pressure for increases in wages is that, by threatening "established incomes," it arouses violent opposition. There are many future incomes which have no present owners and no current market values. These mean little in the present economy of the individual or the corporation. They mean much in the longer life of the community, since they are but a generation or two away. "Organized labor" can afford to lay claim now to increments of income maturing twenty, forty, or sixty years in the future. Two possibilities of this kind are incomes accruing from advances not yet made in the industrial arts and the freeing of an industry from the costs of ownership a generation hence.

(*H*) The leaders of "organized labor" must remember the large number of factors upon which the rate of wages depends over which as a militant organization they can exercise no control. They need to throw the weight of the largest single group in industrial society in favor of changes in habits and institutions which will give to industry an improved organization, lead to the development of our "backward" economic arts, and increase the funds out of which all incomes are paid. Many suggestions of a social policy for raising wages are implicit in the discussion above. Here some four of them will be mentioned.

1. There must be no indifference to the goods and

services which fall outside the nominal wage. The relief of unemployment, compensation for accidents, the supervision of health, and educational opportunities are important items of income. Altho the laborer does not possess over them the direct control he has over his nominal income, the benefits from such services are lasting, reaching quite literally into the third and fourth generation.

2. It must be remembered that there are only two ways to increase the material welfare of laborers. One is at the expense of other groups in the community; the other is through an increase in the wealth out of which all incomes are paid. The first of these has very definite limits; the second is capable of gradual expansion. The discovery, conservation, and utilization of human resources; the improvement in the quality of management; the development of technique with its increased power over "natural resources"; the expansion of industrial equipment; and the perfection of the internal organization of establishments are all problems of significance to wage workers. They should support every measure tending to an improvement in the state of the industrial arts.

3. The problem of finding a better unit than the current dollar for the measurement of values and of reducing the extremes of the business cycle are of peculiar importance to laborers. The vacillation in prices attending an unstable dollar cause a large part of the energies of "organized labor" to be spent in securing nominal increases in wages which merely preserve their purchasing power. The recurrent periods of depression and unemployment attendant upon the business cycle cause trade unions to have to make periodic fights under unfavorable conditions for the retention of wage increases secured upon the upward swing of the cycle.

Freed by the solution of these two problems from perpetual concern with maintaining wages, organized labor can with confidence address itself to the task of raising wages. A positive program of aggressive action can replace a negative one of passive defense.

4. Of greater importance, because more generally neglected, are the problems associated with the development of the economic arts. The stabilization of the dollar and the reduction of the rhythm of the business cycle are problems of this kind. Others concern the discovery and utilization of motives to industrial activity, the reduction of payments for property services to a minimum, the more efficient correlation of the business units within an industry, the elimination of economic waste, and the subordination of business to the production of wealth. "Organized labor" very properly frowns upon proposals for exchanging "capitalism," if that is what the prevailing order is, for a hand-me-down substitute. It cannot afford to become committed to a belief that the prevailing order, or any of the many arrangements which make it up, is a finality. Very properly it should be wary of "reform by agitation." But, on the contrary, in its own defense it must give its whole-hearted support to research in the principles of economic organization and to agencies for the development of the economic arts.

(*I*) Finally, there is no panacea for raising wages. There is no formula for a wage increase which will convert itself automatically into a program of action. "The wages structure" is to be elevated by advances in the specific rates which make it up. The increase in each of these rates must depend upon a procedure based upon an understanding of the factors upon which it rests. It requires a detailed appreciation of these factors in quantitative terms. That procedure must constantly be changed since these factors refuse to abide in repose. No theory of wages is a substitute for an intelligent attack upon a specific problem. The value of the theory presented above, if it has any, is in supplying an approach which will enable such attacks to be made more intelligently.

WALTON H. HAMILTON.

AMHERST COLLEGE.

SKILL

SUMMARY

Two groups of investigators of the relation of the workers to their work, 626. — Both fail to emphasize certain subtle factors of shop lore, 627. — Individual makers of "whole articles" never as common as is sometimes assumed, 627. — In the few authentic cases the work was not especially inspiring, 627. — Nail making, 628. — Pottery, 628. — Current use of the words "skilled," "semi-skilled," and "laborers," 631. — Importance of ability to prejudge effects of processes, 632. — Knowledge of qualities and conditions of materials, 632. — Knowledge of preceding operations, 633. — Ability to manipulate large pieces, 634. — On minor jobs there are many situations that require adjustments and judgment, 635. — The casual onlooker seldom appreciates the skill required in apparently simple operations, 636. — Accurate analysis and description of operations needed, 639. — Entrepreneurs found early craftsmen no more ready to meet their problems than does the modern business man, 642. — Problem of building up an organization largely one of training workers, 643.

A GENERAL article on the subject of skill would have no place at this time were it not for two wholly different group investigators, each group bringing its findings to bear upon modern industry. There is, first, a group of careful scholars interested in securing better occupational descriptions. For the time being emphasis is laid by them primarily upon the actual operations performed. Only after better specifications are secured for the work itself is consideration given to the personal qualities of the worker, such as intelligence and judgment.

The second group of students hope, by going into industry, to describe in terms of first-hand experience the effect of shop work upon the worker. Each group has felt it necessary to see a large number of jobs and industries under varying conditions. Obviously, there is much to be said for finding out what has made for success in persons engaged in particular occupations. The investigator must guard, however, against explaining too much by the particular bias which brings him to the problem.

It is because both groups are failing to emphasize some of the more subtle factors of shop lore and shop experience that I have attempted to point out some aspects of "skill" easily overlooked.

The discussion of the effect of shop work is by no means new. Since the time of Sismondi there has been much in non-technical literature concerning the disappearance of skill in manufacture. The statement is made that the division of labor has broken up occupations until one can no longer find the interest or skill possessed by a workman who made the whole finished article. Still more frequent is the statement that the skilled trades tend to deteriorate into a series of mechanical processes any one of which can be learned in a short time. In other words the workman is pictured as useful merely to remain on guard to start and stop machines.

Going back to the records of the early period, with the exception of a handful of custom trades, some articles of ornament, and the products of a few industries in scattered areas, it is difficult to unearth many really interesting articles made and finished wholly by the same workman. Even then, while we are quoting the "whole shoe," (and I have looked vigorously and faithfully for a range of similar illustrations), we must bear in mind that all "whole articles" were not as exceptional in themselves as the whole shoe. There were nail makers, and harness buckle makers, and any number of makers of none too interesting "whole" articles.

Here is an account of the hand processes in nail making which will illustrate its minutae: "The rapidity with which nails may be made is illustrated by the fact that in two weeks a workman made 40,800 flooring 'clasps' each of which was struck by a hammer weighing 2 pounds twenty-five times, including the welding together of pieces of nail rods which had become too short to work. The number of blows struck amounted to 1,033,655; the rods were heated 43,836 times; a good example of rapidity, skill and minuteness."[1] The nail industry will serve as well as any to illustrate the type of labor which is not made interesting by the mere fact of the product being the entire article. We must bear in mind, too, that when one tries to build up the whole family of screws, and bolts and knobs, and wedges, that this class of article always bulked large in the total manufacture.

On the other hand, wherever we have early records of the details of the shop, there seems to be little doubt that men specialized considerably. Many illustrations might be given, I take but one. In the potteries, in the time of Josiah Wedgwood, there was no assumption that men could do every operation. Wedgwood writes that he had not a man in his shop who could make a *whole table plate.* If one had not his positive statement on the subject, this record of his account books would indicate that hiring was done with special jobs in mind. The following is from Wedgwood's account book as published by Jewitt.[2]

---

[1] W. C. Aiken, in Birmingham Manufacturing Industries, vol. iii, p. 32.

[2] Llewellynn Jewitt, Life of Josiah Wedgwood, pp. 113–115.

1749.		£	*s.*	*d.*
Jany. 27.	Hired Jno. Austin for placeing white, &c. pr. week	0	5	6
Feb. 16.	Hired Wm. Keeling for handleing	0	6	0
Feb. 20.	Hired Wm. Cope for handleing & vineing cast ware, for	0	7	0
March 8.	Then hired Jno. Barker fr ye huvels .... @	0	5	6
March 24.	Hired —— Low for making Slip	0	5	3
March 26.	Then hired George Bagnall, for fireing for this year, for	0	5	3
June 2.	Hired a boy of Ann Blowrs for Treading ye lathe, per week	0	2	0
1751.	Then hired Elijah Simpson for Turning, he is to have pr week.	0	8	0
Jany. 11.	Then hired Saml. Jackson for Throwing[3] Sagers and fireing, pr week	0	8	0

Wm. Keeling spent his days putting handles on crocks, pitchers, and cups. He probably worked apart in a shed, as was usual in his time. Elijah Simpson worked at the lathe, which had been adapted in his own time to the uses of pottery. And when work was in the kiln Samuel Jackson had a keen enough eye for proportioning to be able to fill out the time forming at the wheel. Josiah himself would probably have had difficulty in getting away from the potter's wheel had it not been for the illness which paralyzed his leg.

Even when the worker can plan and produce the whole article, it must be borne in mind that cases of striking originality are not common. We have surprisingly few models of chairs evolved in the period of cabinet making. The model of a Chippendale, a Sheraton or a Heppelwhite dominated a whole period and can be found influencing the models of every country from China to British Columbia. Marshall brings out clearly the element of imitation in cabinet work. He says, "But it seems that there is very little truth in the opinion that all furniture, which has been made by hand, has shown traces of the individuality of the craftsman. Some of it did: and because it was good, it was defended from rough wear, and has come down to us almost unharmed. But in places where nearly all furniture is made by hand, there is much monotonous weary work, without interest or initiative. Thus a visitor to the Grödener Tal, in Tyrol, may find a nest of artists whose wooden statuary is sought for the adornment of cathedrals far and wide; and he may come across a peasant, with hard hands, who loves hay making more than his winter work at wood carving, tho that is of high artistic excellence. But he may also find in the same neighborhood people who carve toys by the cartload, many of which are crude, ill-shaped reproductions of a pattern that has been set to them. An inquiry as to such a load evoked the answer: 'Before our father died, he taught us to make horses like this, and we cannot venture on anything new.' The horses' necks were all bent in the same impossible and ugly curve."[4] The person who undertakes to work out for us the social effect of the machine should not present a sentimental picture of an interested artisan group, original, inventive, and discriminating. In order to be suitable to machine technique there must have been operations requiring less discretion than others. Added to this, processes often were heavy, weary and repetitive. By isolating such operations and applying machinery to the work it was necessarily the operations with least variety which were eliminated first from hand work.

---

[3] Note: Jewitt—"A 'thrower' is the man who forms at the 'potter's wheel' the vessel by hand from the moist clay. The 'ball' of clay being placed on the disc, the boy, or girl, employed for the purpose, turns the wheel quickly or slowly as occasion requires. By this means the disc is made to rotate horizontally and the 'thrower,' who is seated, forms the vessel by hand and by the aid of guides for shape which he has prepared for the purpose. The throwing, it will thus be seen, is the first and most important operation in the forming of the vessels."

If there is a fundamental distinction regarding the method of working it would seem to be found, not in whether the worker makes the whole of the article or a part of the article, but in whether the work is such that "the complete design can be gradually evolved as the work proceeds." Fortunately, for the producer, most manufactured articles can be made from drawings. Every detailed measurement of the article can be worked out. Besides the drawing is as intelligible to the mechanic as would be the machine itself. We must, therefore, look for the problem of skill where the product or part constructed depends upon the certainty of the methods used rather than upon the origination of the actual design.

---

[4] Alfred Marshall, Industry and Trade, p. 808, note.

Considering the glibness with which workmen are pigeonholed as "skilled" "semi-skilled" and "laborers" in many industries, it is surprising to find little definition of what constitutes skill, or lack of skill. Every one takes it for granted that precisely what he means is understood by referring to a workman as possessed of "skill." We still rate as of the highest skill those occupations which existed as trades before the modern factory era. No doubt some of the traditional gradations into skilled and less skilled occupations mean merely that the past lives on, despite the fact that the actual conditions which made the difference have long since faded from practice. More precise, in this particular, is the language of the shop. There is growing up a long list of classified occupations, more or less definite in meaning, from one concern to another. Old terms, too, are tending to be modified. In a time when machine tools were more widely made in each plant, a tool maker was graded as the highest rank metal worker. Now "tool maker" is coming to be regarded as a general term, and a die maker describes a workman of unusual accuracy, precision, and fineness of judgment in metal work.

A long list of exceedingly complex factors are covered up by the lack of analysis of the term skill. Perhaps the most difficult phase of skill to comprehend is the knowledge and ability necessary not only to judge effects, after they have been produced, but to foreknow them. Frank J. Becvar gives an illustration of this kind in the clothing industry. "In hand pressing, the operative must be able not only to recognize the quality of the effect he has produced, but to prejudge this effect on each kind or texture of cloth and thereby know how to treat it." [5] In more general terms Nasmyth writes: "The grand result of thoughtful practice is what we call experience. It is the power or faculty of seeing clearly, before you begin, what to avoid and what to select." [6] In the weaving of the pattern, the designer must know not only that one pattern will be suitable for one class of cloth and unsuitable for another, but he must distinguish in advance between patterns which could be put on fine cloth, but could under no circumstances be suitable for a coarse fabric. While, therefore, to design a pattern a very slight knowledge of materials would seem requisite, actually a knowledge of the technicalities of materials is really necessary.

In a like way knowledge of the effect of change in temperature or atmosphere is necessary. In many industries atmospheric changes affect every operation. In the silk industry whether the operation be winding, knitting, or weaving, a change in moisture affects the breakage so seriously that only the most experienced workers are able to continue effective operation. Less marked, but with equally troublesome problems for the operator are the changes in paper caused by moisture. Nor is it easy to teach one exactly how to control such factors. In the plating industry, in cold weather, trouble is experienced with most solutions because of the crystallization of the salts. To the layman it might seem that the effect of this variation would be felt only in the rooms where the solution was used. Actually the slightest variation affects both machine and hand burnishing, since the irregularity of hardness makes finishing with a burnishing tool very difficult.

---

[5] Frank J. Becvar, "A Method of Grading and Valuing Operations," Annals, March, 1922, p. 16.

[6] James Nasmyth, An Autobiography, edited by Smiles, p. 148.

Some operations require a knowledge of preceding operations. Even in the much discussed automobile assembly where men work in groups, each performing a separate operation, an assembling foreman writes: "If at any time one of the operators gets into trouble with his operations, the other men help him out until the trouble has been killed, thus preventing a delay to the job as a whole." Thus automobile assemblers know something of each other's jobs. One wonders whether the change in machine assembly has been as marked in the direction of less interest in work as it has been in the direction of less annoyance. "Before his (Maudsley's) time no system had been followed in proportioning the number of threads of screws to their diameter. Every bolt and nut was thus a specialty in itself, and neither possessed nor admitted of any community with its neighbors. To such an extent had this practice been carried that all bolts and their corresponding nuts had to be specially marked as belonging to each other. Any intermixture that occurred between them led to endless trouble and expense, as well as inefficiency and confusion, especially when parts of complex machines had to be taken to pieces for repairs. None but those who lived in the comparatively early days of machine manufacture can form an adequate idea of the annoyance, delay and cost of this utter want of system, or can appreciate the vast services rendered to mechanical engineering by Mr. Maudsley, who was the first to introduce the practical measure necessary for its remedy." [7] Again the operation may involve general knowledge of materials, or speeds, or tools. Besides this general knowledge, some work involves the making of many independent decisions such as are necessary in tool work or die making. In tool making the extreme accuracy necessary to do the work successfully is, of course, an important factor. Even when extreme accuracy is not required there is among workmen a persistent estimating of bench work as more skilled than machine work, a belief which is somewhat accounted for by the responsibility felt in making a large number of independent decisions. The rules which guide in such decisions are uncodified. A woodworker will discard board after board until he finds one suited to his purpose. The explanation he would give might be very inadequate to account for the selection and yet there would be an ungeneralized impression among wood workers that no amount of telling would lead an inexperienced person to any sureness of an equally adequate choice.

In addition to responsibility for decisions the actual variety of operations performed is important. Pocket making is considered to be a very skilled operation. "The operative must know how to put in all kinds of pockets — flap, horizontal welt, vertical welt with inlaid facing, crescent shaped pockets, piped edges, patch pockets and the like." [8] "Out and out" work in box making is considered highly skilled tho it is made up of a series of operations no one of which is especially high grade.

Ability to manipulate large pieces often puts the worker in a class by himself. In the making of porcelain vases in Japan Toichi outranks others. He was considered an exceptionally skillful workman. He was said to be the only potter who could fashion the largest vases without the help of machinery. The Westinghouse Company regards work done on a large product as of higher grade than similar work on small parts. Thus men on engine lathes fall into different classes according to the product worked upon. This is a recognition of the value of the product which may be impaired by lack of care. The same consideration, accompanied by some customary recognition of prestige, accounts for paying a higher rate for seaming on high-grade blouses than for the same work on low-grade blouses. An interesting case of the recognition of the value of the product impaired occurs in the supervisory force of mechanical dental laboratories. "The head of the plaster bench earns less than a supervising rubber worker, and the latter earns less than the head of the gold workers." [9]

---

[7] James Nasmyth, An Autobiography, edited by Smiles, pp. 131–132.

[8] Becvar, "A Method of Grading and Valuing Operations," Annals, March, 1922, p. 16.

Is it necessary to continue this list, adding work where special manual deftness is important or to cite the much longer list of small work where extreme accuracy is required? The elements already considered are not intended to be exhaustive. In fact, the listing is undertaken mainly to show that on apparently simple jobs there are many situations to meet involving adjustments and judgments. On minor operations more "skill" is required than is currently assumed. Any plant can initiate a certain number of novices on many of its operations. There is, however, a limit to the number who can be initiated at any one time. A room full of operatives of so-called automatic machines without a generous sprinkling of older operatives would be impossible to supervise. On many operations said to be learned in one or two weeks inquiry elicits the fact that with a longer period the worker becomes considerably more valuable. He learns to meet new situations which arise from time to time. He learns more about the materials, and finally, he has set up for himself danger signals which help him to anticipate many of the difficulties.

---

[9] Ruth Woodruff, "The Dental Laboratory, Mechanical Work and Training." Unpublished report.

It is not an accident that attention to foreman training came in the war period when crowds of new workmen had to be initiated into shops in a short time. Many of our most serious delays in production came not on the highest grade work but in places where the management attempted to use untrained men.

During the war we had a chance to act upon the theory that it takes little training or skill to do minor jobs; that in a few hours a new employee is as good as an old one. What happened? Only the foreman and production supervisors can really appreciate what was the task of oversight. Older workers would have met some situations themselves; other difficulties would have been anticipated; while still more problems would never have arisen. In peace time the proportion of inspectors and supervisors to operators is actually not great; showing again the observation and attention given by men on detail work, as production advances through the shop. By contrast recall the crowds of inspectors in plants during the war. Increase in inspectors was not confined to munitions plants but was part of the whole war problem of costs. Much of this inspection was made necessary by the fact that operations normally controlled by experienced men on minor jobs produced parts that had to be detected after many other defective pieces had been run off by a new operator.

The tendency of a man who knows the work is to upgrade apparently simple tasks. Nasmyth recognized the demands made upon workmen in moving machinery. His commendation would be echoed by every shopman who has had to supervise such work. He says: "The village of Worsley, the headquarters of the Bridgewater Canal, supplied us with a valuable set of workmen. They were, in the first place, laborers; but like all Lancashire men, they were naturally possessed of a quick aptitude for mechanical occupations connected with machinery. Our chief employment of these so-called laborers was in transporting heavy casting and parts of machinery from one place to another. To do this properly required great care and judgment, in order that the parts might not be disturbed, and that the workmen might proceed towards their completion without any unnecessary delay. None but those who have had practical acquaintance with the importance of having skillful laborers to perform these apparently humble but in reality very important functions, can form an adequate idea of the value of such services."[1]

Going to the shop for a short time one can easily overlook factors which would become important in a longer experience. Frequently a machine process can be learned in a short time. To an onlooker the running of the machines constitutes the job but an expert would take that for granted and be interested in some of the situations where it is possible to show the acquisition of fairly accurate judgment. Some of these factors become apparent whenever one attempts to actually find trade tests which will differentiate expert workmen from others less capable. Frequently the test really appears to be outside the actual job. For instance, the best inside lineman's test in the army — that which really differentiated workmen — was an outside wireman's job. The fact is that a really good inside wireman does know something of outside wiring.

---

[1] James Nasmyth, An Autobiography, edited by Smiles, pp. 216, 217.

We have swung quite far enough in depreciation of the "skill" of machine operators. Much of the swing is due to the fact that when one person uses the term "skill" he means variety of processes whereas another means knowledge of the capabilities of materials or expertness in tooling or chasing. If the issue were made definite every one would agree that "Modern work is more narrowly specialized, in so far as the number and variety of the operations performed by a modern worker are on the average less than those of the elementary skilled handicraftsman: but it is less narrowly specialized, in the sense that an operative, who has mastered the accurate, delicate and prompt control of machinery of any kind in one industry, can now often pass, without great loss of efficiency, to the control of similar machinery in an industry of a wholly different kind, and perhaps working on different material." [2]

I am not attempting to discuss the problem of monotony or interest in work. What I am concerned in showing is that every decade has been one of change in the particular elements which made for skill. When the early carpenter spent much time with a saw ripping the parts he needed from heavy boards, he might have been a better sawyer than when he spent his time fitting panels or trimming moldings. In a period when there was nothing to guide the pressure of a tool on the piece of metal the slightest variation made an irregularity of surface that had to be touched up, and fitted by filing. In such a time an old workman might well describe another as being "*quite splendid* with an eighteen inch file." What was fine in the workmanship of this period should be appreciated. I have no desire to underrate the accomplishments of early production. Even then, however, every workman was not a "best" workman. We hear much in these days of the workmen who cannot make their own "set up." Does any one think that every weaver in the household period was able to set up her own web in the loom? If so, he has read his history badly. Gaps in "skill" were filled in by the spirit of neighborliness and a half dozen looms in a half dozen cottages waited for the visit of a specially intelligent neighbor to help pick up the puzzling threads that arranged the pattern in the hedles. The same spirit of neighborliness, now, prompts workers to keep an eye on the new comer. A hint here, and an explanation there, helps tide over a learning period which is difficult for both worker and foreman.

---

[2] Alfred Marshall, Industry and Trade, p. 10.

This brings us to the phase of shop work least appreciated. It is comparatively easy to learn to operate a machine. Much more subtle is the knowledge and control of the materials of trade. While we have really made headway in the standardization of certain processes, much remains for research in the field of raw materials. Still more detailed should be the study of the control of these materials at different stages of manufacture. There is here a real problem which should command the best thought of the many students who are now fooling themselves into thinking that they are passing as real workers in industry. To contribute anything valuable one would have to stay in an industry long enough to experience some of the later stages in learning, instead of the first thrills of a new environment. It would be a measurable contribution if we could get some really thoro first-hand observing by persons capable of describing problems as well as the routine of processes. One who has come from the shop goes wearily through the present writings on the subject describing, in a purely mechanical way, processes of the utmost importance. From reading the following who would know that one of the most important processes in the box industry is being described.

> The operator has but to place the box in the center of the freshly glued wrap supplied to her on a rotating table by the gluer-off and place the box and wrap on the form the exact size of the box. This form drops automatically, passing brushes and rolls that press the wrap to the box, folding it at the corners and turning in the paper projecting at the top. Then the box is pushed out of the machine and the form rises to receive another box and wrap.

Contrast with this the keenness of perception and the appreciation of the interrelation of manufacturing processes in this description from one who went to the shop thinking in terms of the problem instead of in terms of herself.

> One of the last operations in the making of a rubber shoe is the placing of the "upper" over the lining of the shoe. This piece of rubber is not vulcanized and its condition may vary greatly, according to the experience and judgment of the man who runs the stock in the mill room. If the calender man lets his rolls get too warm, the rubber stock is likely to be sticky. If the day is cold, or if the stock was prepared one or two days sooner than usual, the rubber will be too dry to adhere to the lining, and will form blisters when vulcanized. Very quickly, the maker, in opening her book of uppers, will learn how to use her judgment in handling them. If she feels them too "sticky," the deftness of her fingers and the rapidity and preciseness of her movements will prevent the material from forming folds which would destroy the quality of the shoe. If she sees that the rubber stock is too dry, she knows that a small amount of cement will make it adhere to the lining as it should. And it is likely that she will experience a feeling of satisfaction in mastering the whims of a piece of unvulcanized rubber.[3]

Real description of a modern industrial process should imply keeping the process in its setting. If one's task involves working with paper and glue on a delicate machine, some day there will be more to do than to primly

[3] France M. A. Chalufour, unpublished notes.

"place the box in the centre of the glued paper." In fact the forceful language of Giddings, in another connection, is not out of place here. "The laborers that have no adaptiveness, that bring no new ideas to their work, that have no suspicion of the next best thing to turn to in an emergency, might better be identified with the dependent classes than with the wealth creators."[4] It is strange to find persons who go to industry with an honest intention of understanding the worker, actually describing the shop with about as much comprehension of what is involved in production processes as the summer boarder carries away with regard to the problems of the farmer.

Modern industry involves a care and experience in the detail of processes very likely to be taken for granted. Often one can cite a key process, variation in which affects all others. Whole volumes could be written on the effect of the variations in the calendering process; or better still, on the different way in which these variations affect every worker in the whole series of rubber-finishing processes. In the metal industry, despite the great assistance of chemists, it would be impossible to secure steel so uniform in content and so even in hardness that there would not be at some point daily variations that would affect grinding and machining throughout the shop.

Further, if one considers the delicacy of adjustment of many machines doing minor processes there is too little outright admission of the importance of machine operations. Again when one recalls that we are working to much more precision of measurement than ever before, the wonder is that, despite the passing of the all-round man, so little is said of the amount of "skill," perhaps developed in a different way, which remains in our shops. Summarizing these, we conclude that it is not because the modern machinist cannot handle a file in the *quite splendid* way in which Maudsley manipulated it; it is not because he does not make his tools by hand; or even because he makes only part of the article that he can less effectively meet new situations. In so far as there is any truth in the much quoted passing of the general machinist the cause lies more in lack of knowledge of the materials of his trade.

---

[4] Franklin H. Giddings, Studies in the Theory of Human Society, N. Y., 1922, p. 237.

In every occupation there is from time to time more or less evolution in the elements of the trade which would be emphasized. Often the change means the substitution of scientific methods for empirical. When this happens the "skill" to meet the variations due to former rule of thumb methods goes and its going is not to be deplored. In its place comes a specialized knowledge of the new development. Whenever industry thus steps forward the innovators must grapple with the problem of training up workers to suit their purpose. They draw upon the trades most closely allied. Some accumulated experience is thus supplied by the workmen. During the transition innumerable experiments conducted before the workers give them, in time, a code of practice to apply to the new situation. In this way the first technique of an organization grows up. Later workers will be trained by these earlier comers without the stage of experimentation and despite later changes in technique the atmosphere of the shop continues. Entrepreneurs found early craftsmen no more ready to meet their problems than does the modern business man. Watt was in despair with the "villainous bad workmanship" of the smiths of Glasgow. Wedgwood was "teased out of" his life by workers unsuited to his problem. He wrote: "We have stepped forward before the other manufacturers, and we must strive to train up hands to suit our purpose. Where, among our potters, could I get a complete vase maker? Nay I could not get a hand through the whole pottery to make a table-plate without training him up for that purpose; and you must be content to train up such painters as offer, and not turn them adrift because they cannot immediately form their hands to our new style, which, if we consider what they have been doing all their life, we ought not to expect from them." [5]

This problem of building up an organization was recognized long ago by manufacturers. In 1825, John Martineau, testifying before the Committee of the British House of Commons, said, "there would be less difficulty in increasing an establishment already existing than there would be in the formation of a new concern; in my case I should draft off some of my superior workmen to the new establishment and fill vacancies with new men." [6] Altho modern industry is far more concerned with the building of a smooth working organization than were the early enterprisers, among employers only slowly has there grown up the impression that it takes years to build up an industrial organization. Even now, no one specifies, what are the mysterious factors in the building. As already stated, each decade has seen changes in the factors most prized in a journeyman. The work of Bentley, Watt, Brunel, and Maudsley trained up a new group of mechanics, supplied with better tools and fitted for more accurate work than could be procured through the old whitesmiths and blacksmiths. By the time of Clement ability to draw was the hiring passport. We have still further specialized draftsmanship.

While this evolution in skill has gone on in our shops our thinking has lagged a half a century behind in appreciation. We have harked back to the small shop and the whole article.[7]

---

[5] Samuel Smiles, Josiah Wedgwood, p. 167.

[6] British Parliamentary Papers, 1840, vol. 24, p. 20.

What I have intended to stress is the need of evaluating our present problem in terms other than those of the *journeyman-apprentice* days which have passed and have taken with them much heavy, weary work as well as much tedious fitting, filing and laborious drilling. In its place we have left some new work that is dreary. We have besides, much new work done with more delicate and more sensitive machinery. Because the machinery is sensitive we have given it much attention and thrust upon the workman the problem of using sensitive equipment with rather little attempt to standardize raw materials. The future will bring much correction in recognition of the importance and problems of machine jobs.

The problem of the manufacturer is to rate work in such a way as to prevent the loss of the actual contribution and control of the minor jobs. It is not an easy problem. It is a problem of ever changing factors and of ever more complex combinations. To appraise skill in terms of the small shop and the hand tools of a pre-factory age is to evaluate its most obvious and least significant aspects.

Attention has already been directed to the fact that one of the intangible elements of skill is experience in judging the effect of a process and in varying it to meet the factors that cannot be controlled. This conclusion involves a new approach to the question of job descriptions and interest in workmanship. We need "job specifications" made with imagination enough to include what the worker himself sees as the fine points and importance of the task which he performs. Technically we need specifications that take count of the variations in processes. We need specifications that picture the man in the organization, not on a desert island of perpetual motion.

---

[7] "A man who could draw or work to a drawing in those days was regarded as a superior sort of mechanic." Samuel Smiles, Industrial Biography, Iron Workers and Tool Makers, 1879, p. 241.

A new conception of skill involves recognition of the continuously varying factors in the modern industrial relations problem — factors the evaluation of which will require the bringing together of the findings of science in many fields of study.

ANNA BEZANSON.

UNIVERSITY OF PENNSYLVANIA.

THE INTENSITY OF CULTIVATION

SUMMARY

Question of intensity of culture an old one; never purely objective, 646. — Ability of the entrepreneur the limiting factor, 647. — The problem of intensity of culture stated in one of three ways: entrepreneurship fixed, land fixed, capital fixed, 648. — An experiment may be made with something less than the whole amount of land or capital, 653. — An illustration of the difficulties of the trial method, 654. — Income will be alike for all at the margin, 657. — Intensity varied within a given year, 657. — Social aspect of intensity of culture, 658. — Effect of change of price of product or intensity of culture, 659. — Payment of rent induces intensity of culture, 661. — Effect of changes in wages or capital cost on intensity of culture, 662. — Intensity will vary inversely with these costs, 662.

The question of intensity of cultivation is as old as economics, yet it forever keeps coming up for more definite statement, or for a statement showing how the proper degree of intensity is visualized and approached. The most usual way out of the difficulty is to assume the most advantageous combination of land, labor and capital, and let it go at that. No doubt there always is a best combination, just as there is a best mixture of paints for the best effect, and this truism may easily recall the famous reply of Whistler that he always mixed his paints with brains. It is exactly this requirement that makes the formula so difficult for intensity of culture. The problem is never purely objective. It is not as simple as making the proper combination of air and gasoline in a mixture for power, since it makes no difference who adjusts the carburetor so long as it is properly adjusted, the results are the best obtainable. On the contrary, in the combination of land labor and capital for producing the best results the personality of the man making the combination makes all the difference imaginable in the results. A gasoline engine in the hands of a novice may do substantially all it is capable of doing tho planned, adjusted, and repaired by parties not immediately concerned with its work. A farm can hardly be so standardized and managed. The work of the entrepreneur in agriculture is bound up in the operations almost as though he were a vital part of an organism; he must be the active, indeed, the indispensable agent.

Whether or not the return to the entrepreneur is viewed as a part of the larger category of wages, it must be recognized that the limiting factor *par excellence* is the ability of the entrepreneur. It makes no difference whether the limits are found in the unwillingness of the entrepreneur to undergo greater strain; whether he reaches the point of losing money; or whether he prefers a certain measure of enjoyment in place of further work. Any one of these conditions means that he is not in a position or attitude for further expansion. In other words, the point of diminishing returns has been reached and the income of each individual is thereby circumscribed; likewise social income is, because of this fact, held within certain positive bounds. The proper proportioning of the factors of production, which is the means of arriving at the proper degree of intensity of culture, involves four variables. Since no problem can be discussed with four variables it is necessary to assume metes and bounds for all but one at any given time. For convenience the ability of the entrepreneur, which no doubt is more or less elastic, may be taken as fixed. It is by all means the most definitely fixed of any of the factors involved. There is a limit beyond which an entrepreneur does not care to go in the effort to increase his income. In many cases it is a limit beyond which his banker refuses to carry him. But whether it be the limit set by the banker; by his own courage, or lack of courage; by his desire for leisure, for avocations; or by sheer managing ability; it must in some manner reach the limit beyond which it will not for the time being go. Thus the entrepreneur himself is the most definitely limiting factor in production. His managing ability may be viewed as fixed.

For convenience it will be desirable to put capital and labor into one category. From the entrepreneur's standpoint they are both reducible to a money unit. This combined factor is subject to variations which affect intensity of culture, but they may be waived for later consideration.

The intensity of culture problem may be stated in three ways, or rather it must be viewed from three standpoints:

(1) It may be assumed that entrepreneurship is fixed and that capital and land are applied to it in varying amounts.

(2) Land may be viewed as fixed and capital varied, entrepreneurship being taken for granted.

(3) Capital may be fixed and land varied, entrepreneurship still being assumed.

Added to these three points of view there may still be a fourth, which is however, hardly more than a corollary to the second and third. It may, at least in practice, be necessary for the entrepreneur to treat both land and capital as variables while working out his proportions. This is hardly more than a detail, though possibly a very difficult one to handle.

Concerning the first point of view, it may very safely be stated that entrepreneurship is the most definitely limited of any factor involved. At the same time it is the one which is without visible proportions or tangible measurement. Were it not, however, just as genuinely limited as land or capital we should have numerous bonanza farms. In fact, so far as a given individual is concerned the most important of the limiting factors is that of his own managing ability. Were it not for this he could manage the agriculture of a township, a county, or a state.

But it may be objected that this is not the issue. Entrepreneurship may set the bounds of size of business, but not enter into the question of proportions of factors used. This at once raises the question as to how such an assumption can be made in view of the necessity of working out, on the part of each entrepeneur, the proportions which for him are best. How this can be done without using both land and capital, varying each alternately, then simultaneously is, to put it mildly, not obvious. Could the farmer, for example, determine by any possibility that he could do best with any particular amount of capital before discovering the amount of land with which to combine it, the problem would be simple both theoretically and practically. Since there appears to be no means by which this measurement of entrepreneurship can be made in advance of an experiment involving all factors, it will be as well to consider the second and third points of view before undertaking to say the final word, or even to draw any conclusions respecting the first count.

Land may be viewed as fixed. Very properly it may be objected that in a theoretical case land is never fixed, but may be varied in either direction, more or less. Even so, land is fixed in quantity for the majority of farmers over appreciable periods of time. Perhaps we are not dealing with the majority of farmers, but only with the few who are alert enough to attempt an intelligent solution of the problem of intensity of culture. Very well, these too will in both theory and practice deal with quantities of land which are fixed during a given experiment. We may have, then, a fixed amount of land, not fixed by inertia, by heredity, or passing circumstance, but by the judgment of the entrepreneur. This may be merely a trial judgment, but even so it means that for the time the amount of land is fixed. Upon this amount of land the entrepreneur expends capital. The question is: How much? and the answer is easy. He will continue to expend capital until the last dollar just pays for itself. By so doing, assuming that he can get capital at commercial rates up to the limit of his ability as an entrepreneur, he will increase his income, and it is income he is after, total income, not any given rate on a limited sum. We may next inquire how this hypothetical farmer is to know that he is using the right amount of land. He will use his judgment, his observation, and his experience; and make trials with different amounts. That the more vital limitation is in ability to handle capital rather than land should be recognized, but capital cannot be managed except in connection with land. Moreover, the optimum amount of capital for any entrepreneur cannot be discovered by using wrong proportions since he could not decide whether the failure to arrive at satisfactory results was, in a given trial, due to poor management or a wrong combination. He will find out as he approximates the correct combination, and in doing so he will of necessity find the proper amount of land to be used with an amount of capital, yielding, on the enterprise so constituted, favorable returns. For any serious trial the land must be fixed for the time, no matter how many times it be varied for subsequent trials. Thus land may be viewed as fixed, and in every trial the capital applied until the last increment just pays its cost. For a vast number of farmers the land is very firmly fixed in amount for years or for life. For the adaptable man it is fixed at different amounts until the most favorable acreage is discovered.

Capital may be viewed as fixed. No doubt this is the most elastic, and possibly the most satisfactory, supposition. It is not forgotten that the real limitation is managing ability, but the best measure of this ability is the capital which can be advantageously handled. To assume that capital really is fixed by circumstances and not ability is as crude reasoning as to assume land fixed. The able entrepreneur uses capital which he happens to have, or which he can borrow, or disposes of a surplus, exactly as is done in the case of quantities of land. He finds the amount which will yield him the largest income by taxing his entrepreneurship to the limit, by which process he comes, like everyone else, to the margin of his powers. He may, as a supermarginal farmer, be able to make his capital earn something well above average commercial returns. For instance, his curve of returns on his thousand dollar units may at its highest point rise well above that of his competitors. There is no reason why he might not stop his investments at a point where he was making, say 20 per cent. No reason except that he could make a larger absolute, not percentage, income by increasing his investments until the last increment just paid its cost, whereas it was assumed that in order to get the highest average a lesser amount was invested, and a return above the commercial rate secured from the last dollar.

However, it was decided that capital should be viewed as fixed. With this Rubicon safely passed, the campaign is easy. All the entrepreneur needs to do in order to find his best proportions is to add, or subtract, land until the last acre just pays its own cost. When this point is discovered he has his best proportions. The reason why this is not satisfactory is because the major premise will not bear analysis. It must be taken on faith, and having accepted the faith, the logic no longer gives trouble.

Just as with land, capital must be for a given time fixed. A farmer decides on the number of men and teams, and the amount of other equipment to be used in farming for a given year without, of necessity, deciding in advance the exact acreage of land. He arrives at a decision as to land, and after the year is over does his best to decide whether he had too much or too little. Should it seem that he is wide of the mark he will, in most cases, vary the amount of capital as well as the amount of land in projecting a new trial. To decide that his capital is right in amount but that the land is wrong means either that he has approached very nearly to the correct proportion or that he decides the one question independently of the other. But to know how much capital is best without trying it out is to know the solution of the problem in advance of the trial. This could be done in but one of two ways, viz., either by arriving at a decision based on experiments which gave results short of the optimum, or by solving the proportion riddle on a trial plot and carrying the result over to the whole. Neither hypothesis stands scrutiny.

It is, however, beyond all doubt true that so long as the capital remains fixed, whether right or wrong in amount, the entrepreneur will, in following his own interests, apply land to it until the last increment just pays for itself. If the land bears a rent it will mean that the returns cover the expense of operation and the rent charge. If the land is free it will mean that the returns just cover the outlay for operation. No matter how stated, it amounts to the addition of land so long as there is a margin above cost and no longer.

Managing ability may be looked upon as fixed and land and capital both as variables. This is nothing different from the above discussion, but it is the real situation confronting the real entrepreneur. Should he attempt to add increments of land and capital he may do so by assuming the solution of the question at issue — the proportions. If he add units of first one and then the other he will show himself very human and adaptable, and will stand some chance of approaching the goal eventually. Each factor will be fixed for a time, but it will not remain fixed until the proper proportions have been found.

As a means of arriving at the optimum apportionment it may be interesting to attempt the experiment with something less than the whole, or fixed, amounts of either capital or land. That is to say, a trial, or laboratory experiment may be run in order to arrive at the correct proportions, on the basis of which the size of the business will be determined.

The question may very properly be raised as to the logic of these standpoints. For example, does the limitation of the entrepreneur's ability enter as a consideration into the question of the proportions of land and capital which are found best? It may be contended that whatever the optimum proportion as between land and capital no changes will, in this relationship, be contingent upon the ability of the entrepreneur to handle more or fewer units. However, it is a matter of common observation that as the size of the enterprise varies up or down there is a corresponding, tho not necessarily proportional, change in the degree of intensity of culture. For example, suppose a farmer to find the best degree of intensity on eighty acres, but feels able to manage three eighties. Can he carry the same intensity over the additional two eighties? He can, provided his degree of intensity on the one eighty is adapted to the operation of the full-sized unit. To assume that such is the case is merely, and clearly, to beg the question. Finding the proper degree of intensity on the three eighties is the problem; but to find on a part of the whole enterprise what seems to be the best proportion is possible on paper only. This is true because the manager has no way of knowing, while running the experiment, that he is giving to it any exact proportion of his managing ability. For this reason he cannot, after trying out a part of his farm, including a corresponding part of his entire equipment and management, assume his proportions and calculate the size of the enterprise for succeeding years. That a manager may get suggestions from an experiment involving part of his farm is beyond argument. He may, and should be able to do so. But after all possible suggestions have been gained, the business must be tried out as a whole before either proportions or size can be known.

If it is possible to determine proportions by the laboratory method such possibility should be at least theoretically demonstrable. One may construct tables and diagrams showing how the problem is solved, but suppose, instead, an attempt should be made to visualize the operations of a real operator. Surely such a demonstration is fully as real. If it be supposed that the trial, a laboratory experiment as it were, is conducted on a small scale the troubles suggest themselves at once. It is hard to find the right combination on the small area as a gauge for use on the larger area, or for that matter, since the experimental operations might just as well be on a large scale, it would be hard to adjust the duties of the entrepreneur so as to know how much less to operate, or how to operate it.

The above generalizations can be illustrated. Suppose a farmer wishes to determine the optimum combination with respect to the cultivation of corn. He tries a ten-acre field and by the correct combination of check plots finds it more profitable to plow seven inches deep, harrow four times, plant in drills instead of hills, cultivate three times instead of four times, and do one day's hand weeding per acre. Can he apply this to the area he thinks it best to attempt? It may easily happen that he plans to grow eighty acres of corn. The number of operations of each kind performed may be done on the larger field the same as on the smaller one. The plowing and harrowing may occasion no difficulty, but the chances are that it will be relatively harder to plow at the rather unusual depth, and to harrow at advantageous times. Of course, it may be shown theoretically that the larger fields are logical multiples of the smaller and that the work could be done in the same manner. In all probability this cannot be carried out. For instance, the small corn field was drilled, cultivated three times, and one day's hand labor used per acre. The larger field should be handled in the same manner, but the chances are that it will not be so handled. The weather will be more of a factor when the experiment assumes larger proportions. So will such matters as hiring the requisite quality and number of laborers. Should the farmer find that a given amount of labor and equipment could be used advantageously on twenty acres, and in that connection determine his proportion, it might be easy to multiply the labor and capital by four in getting ready for the eighty acres. This is substantially never done. An attempt is made to economize on equipment as the unit is enlarged, and inevitably the ability of the entrepreneur is a constant, and therefore not subject to automatic expansion and contraction to fit the different units operated. It will be found that cultivating corn three times is not the same under one condition as under other conditions. Perhaps the three cultivations were made at the most advantageous times, promptly after the corn was big enough to cultivate for the first time, when it needed cultivation subsequently, not when other work permitted it to be done. The hand labor of a day per acre found profitable on ten acres will again and again not be feasible on a hundred acres. Very well, leave it out in both cases. That is the point. The laboratory trial must be made to fit the condition of the full area, but the full area carries its own conditions and thereby determines to a degree its own proper intensity of culture. The trial area will actually work when it is big enough to absorb the whole available capital, and at this point we have, if it be accepted, to abandon the idea of predetermining proportions between, or among, factors.

If the foregoing reasoning is correct it will follow that all managers, marginal and supermarginal, large and small, will find no stopping place in applying land to capital until the last dollar just balances its cost; until the last acre of land just pays for itself; and until the proportion is such that land and capital costs are alike in returns per value unit. The average returns per dollar will be high for some, low for others. How high they will go depends on the ability of the manager. The lower limit is commercial return so long as a deficit is not made up out of wages. But all, from the best to the poorest, will not escape the necessity, and the privilege, of investing until the last increment brings in no added returns above the cost, and at these margins all men are equal. Of proportions there may be no two alike. Of average incomes no two alike. But for each there will be a best proportion and he will find it by using all of his ability as an entrepreneur, and alternately fixing capital and land, proceed until neither separately nor jointly can his income be augmented by further additions. Each has balanced at the margin where cost and income are equal.

The discussion thus far has assumed the point of view of a business projected for at least a year in advance. During each year the problem is bound to assume different aspects. After every plan has been made as carefully as possible and the season has advanced to the point where acreages cannot profitably be changed there will be constant opportunities to invest more, or less, capital on a given project than was contemplated. The aggregate amount of capital used may be rigidly limited to a sum previously known. It may be all that is obtainable, but the chances are that no such definite bounds are set. Capital is usually obtainable with greater or less ease depending on the amount wanted. A certain amount is in the possession of the entrepreneur. Another amount is to be had at commercial rates with no trouble involved. Still more can usually be had at greater cost in both trouble and interest rate. The law of increasing cost operates as truly in the work of getting the use of capital which one does not own as in the creation of more capital in the form of goods. Thus far shalt thou go and no farther in the possession of capital involves the cost of the successive acquisitions. Thus the amount required for a given season depends on the exigencies of the occasions as they arise.

The question may very properly be asked whether society is best served by the economic forces which constantly put the ablest farmer in possession of land, largely the best land, and as constantly push the inefficient out. This question becomes especially pertinent when it develops, as well it may, that small farmers are giving place to larger farmers. To the extent that this happens there will be fewer farmers, tho perhaps not fewer persons engaged in agriculture, on a given area of land. From the standpoint of production the case is not open to argument. Society is best served by farmers who will get the most out of the land, capital and labor employed. The only question at issue becomes, then, the relative social advantage of land ownership as opposed to whatever may displace it should inefficient farmers give way to the more efficient. This brings up other considerations. The intensity of culture which gives the best results to farmers viewed individually will give the best results socially so far as the ownership and use of land is concerned, judged by the standards of a healthy society. If from the standpoint of social pathology it should become necessary to use land as a prophylactic, economic considerations will of necessity be subordinated in the process. Until that time comes the impersonal workings of the law of diminishing returns, of which intensity of culture is a leading manifestation, is in harmony with the social good.

EFFECT OF CHANGE OF PRICE OF PRODUCE ON INTENSITY OF CULTIVATION

Every now and then a situation such as that occurring in the spring of 1917 confronts the farmer. The prices of what he had to sell rose rapidly while the costs of production remained relatively constant. Likewise, the rent of land remained about at the old level. What effect does such a situation have on the farmer who is always trying to adjust his land and capital in such a way as to get the most out of it for himself? Before attempting to answer the question it may be well to note the fact that the case is a temporary one, the inevitable tendency being always to return to the original proportions. However, the abnormal condition may last for a few years, and the tendency to return to the former balance may never be more than partially realized. That is to say, the abnormal situation may persist until it becomes a new normal. At all events, it is perfectly clear that disturbances such as the one noted above are constantly occurring in varying degrees. This one was extreme. The readjustments to meet such conditions may be so slight as to escape observation nine times out of ten; the tenth time they are likely to be conspicuous.

For convenience of presentation we will do a little violence to the facts as they confronted the farmer in 1917 and assume that prices of farm produce doubled while costs of labor and capital remained constant, rent also remaining constant. What was the best move for the farmer to make regarding the proportions of capital (including labor) and land used in his enterprise?

The following table will be useful in deciding the matter:

Expenses per acre	Value of crop per acre	Rent per acre	Returns per dollar of expense
$6.00	$11.00	$5.00	$1.00
10.00	15.10	5.00	1.01
15.00	20.30	5.00	*1.02*
17.50	22.67	5.00	1.01

Doubling the value of the produce the table becomes:

Expenses per acre	Value of crop per acre	Rent per acre	Returns per dollar of expense
$6.00	$22.00	$5.00	*$2.83*
10.00	30.20	5.00	2.52
15.00	40.60	5.00	2.38
17.50	45.34	5.00	2.31

Thus the optimum expenditure per acre has changed from $15 to $6. As a result a farmer with a capital of $3000 to use will require 500 acres of land instead of 200, assuming the latter to be the most favorable amount before the change in price.

One more hypothesis may be of interest. Suppose the price of produce had fallen 50 per cent, other things remaining the same. The table would then appear:

Expenses per acre	Value of crop per acre	Rent per acre	Returns per dollar of expense
$6.00	$5.50	$5.00	$.083
10.00	7.55	5.00	.255
15.00	10.15	5.00	.344
17.50	11.335	5.00	*.362*

As was to be expected, the proportion most favorable is now $17.50 per acre, a more intensive cultivation than the optimum in the first instance.

It may be objected that the above illustrations are based on a particular set of figures and that some other set might fail to show a similar result. This criticism is always in point when a generalization is attempted on the basis of an arbitrary instance. However, it is not necessary to rely on any particular table. It may be assumed that the proposition has been proved, not here but by reasoning generally accepted, that free land will be farmed less intensively than land commanding a rent. From this accepted proposition it may be reasoned that the tables submitted above are of necessity correct — and that any change in figures while possibly concealing the truth cannot disprove the principle. The deductions would be somewhat as follows: the payment of rent compels greater intensity of culture. Hence, the intensity will increase though not necessarily in the same proportion as the increases in rent. Conversely if rent decreases, the intensity will decrease. Now an increase in the value of the product, with no other change occurring, is equivalent to a decrease in rent since a smaller portion of the gross yield is required to pay the rent than was required before the change in price. To decrease the quantity of produce needed for rent payment means a movement in the direction of free land and, therefore, a movement toward a more extensive culture. Should the price become extremely high the rent would become relatively reduced, even extremely low, and hence would lose most of its influence in the direction of intensive culture, the optimum degree of intensity decreasing with every rise in the price of produce, and conversely increasing with every fall in such prices.

The above discussion has been made as tho neither capital nor land were fixed in amount and the proportion only were the issue. The objection to this view has been discussed in the first part of this article, and hinges on the difficulty involved in apportioning the attention of the entrepreneur to a single acre, or to any group of acres short of the number included in the enterprise over which he is presiding.

EFFECT OF CHANGE IN WAGES OR CAPITAL COST ON INTENSITY OF CULTURE

Another question is what will happen should wages rise or fall while prices of produce, interest and rent remain constant? It may be noted in passing that, where no rent is paid, should wages and interest rise or fall in unison that nothing will happen to the proportions in which capital, labor, and land will be combined. This is a contingency which will rarely occur. Thus while we united capital and labor into one term for convenient handling while discussing the degree of intensity in the first instance it is necessary to separate them when considering the changes that may follow a rise or fall in wages, or in capital costs, the two factors not acting the same in the matter of percentage changes. The occasion for such a discussion is abundantly illustrated in the recent experiences of farmers with the labor question. The following tables will bring the matter to light:

Expenses per acre				
Labor	Capital	Total	Gross returns	Return per dollar
$5.00	$7.50	$12.50	$21.00	$1.68
7.50	8.50	16.00	27.20	1.70
9.50	8.50	18.00	30.80	*1.71*
10.50	9.50	20.00	33.00	1.65

Increasing labor expenses by 100 per cent the table becomes:

$10.00	$7.50	$17.50	$21.00	*$1.20*
15.00	8.50	23.50	27.20	1.12
19.00	8.50	27.50	30.80	1.12
21.00	9.50	30.50	33.00	1.08

As shown by the table the increase in wages results in a movement toward a more extensive culture. In actual practice the case would not be as simple as this, or at least the simplicity, if there should be such, would take on a different aspect. The farmer confronted with the higher wages is bound to think of a way to escape other than the one indicated in the second part of the table which involves getting more land. He will try to escape by way of a substitution of capital for labor. He will buy a gang plow, a tractor, a milking machine, or more haying tools, with the hope of keeping up his intensity of culture without incurring the added expense resulting from the higher wages. In some cases he may succeed in maintaining his former intensity judged by results while moving toward more extensivity judged by the application of labor and capital to land in terms of dollars per acre.

The changes in prices of produce, wages, and capital cost will always, respectively, have an effect on the desire for the other factors, and hence change the price of these other factors. The result will be a new balance which is likely to be similar to, though not identical with, the previous balance before the disturbance came. The importance of the immediate effect may be appreciated when it is remembered that more or less occasion for a readjustment no doubt takes place yearly, or even at much more frequent intervals.

A change in the cost of capital goods, or in interest rates, where wages do not change correspondingly, will bring about changes in intensity of culture similar to those noted in the above discussion of changes due to variation in wages. If capital goods cost more, fewer, relatively, will be used; if they cost less, more will be used. Thus intensity of culture will vary conversely with these costs.

Whether or not rent is to be counted as a cost is a disputed point. No attempt will be made here to clear the matter up. In any case it is a cost to the individual who buys land as a part of his equipment for producing farm crops. Under these circumstances, viewing rent as a charge against the farming business — a current cost comparable to interest and wages — the case of intensity of culture assumes a new aspect. Should the labor-capital cost rise, or fall, in some proportion, as by twenty-five, or fifty per cent, rent remaining constant, the point of optimum returns will be affected. This must obviously follow since the labor-capital cost plus the constant rent will bear a varying relation to the income obtained by the different degrees of intensity of culture after the former has been increased or diminished. Thus in the first part of the table following the best results were obtained with the intensity indicated in the fourth line, while after the rise in labor-capital costs the next less intensive application is the best.

Labor-capital cost	Gross returns	Rent per acre	Returns per dollar expended
$14.00	$35.00	$10.00	$1.46
15.00	37.00	10.00	1.48
16.00	39.00	10.00	1.50
17.00	40.90	10.00	*1.515*
18.00	41.50	10.00	1.48

Increasing the labor-capital cost by 50 per cent:

$21.00	$35.00	$10.00	$1.129
22.50	37.00	10.00	1.138
24.00	39.00	10.00	*1.147*
25.50	40.90	10.00	1.124
27.00	41.50	10.00	1.121

Not only does the rise in the cost of labor and capital result in less intensive farming as seen by the rise from the fourth to the third line of the above table, but the same influence is seen in the results of the first and second lines. The swing toward the less intensive is manifest in these as well as in the subsequent lines, there being a reduced advantage in each step toward the more intensive.

The results found by taking particular figures for the demonstration may be open to criticism. It is true the relations of the figures in the fourth column may be varied indefinitely by varying the relations of the numbers chosen for columns one and two. In some combinations the trend may be obscured, but in no case will it appear to lie positively in the opposite direction.

It is not forgotten that in these discussions concerning the results of changes in prices and costs on intensity of culture the solution of the intensity of culture riddle, as a practical problem, cannot be worked out as a mere arithmetical calculation. Even so, the influences of these supposed changes in costs would seem to be in the directions indicated.

B. H. HIBBARD.

UNIVERSITY OF WISCONSIN.

REVIEWS

STODDARD'S THE REVOLT AGAINST CIVILIZATION — THE MENACE OF THE UNDERMAN; DESMOND'S LABOUR, THE GIANT WITH THE FEET OF CLAY[1]

Mr. Stoddard has a keen nose for the wider problems that loom upon the horizon. He has already written of two such problems in a way that has excited widespread interest; and his new volume is likely to be equally widely read. The first half of the volume is a forcible and striking restatement of the thesis that the burden of our modern civilization is threatening to prove too great for the populations that support it. This, he maintains, is the consequence of two tendencies that have long been operative and seem to be increasing. One is the tendency for the processes of natural selection (which are held by the majority of modern biologists to have been the sole agency of progressive evolution in general and therefore of the differentiation and improvement of the races and subraces of mankind) to be arrested by the advance of civilization and to be replaced by a variety of forms of selection all of which make for positive deterioration of the peoples among which they operate. The reality, the strength, the extent and manner of incidence of these forms of reversed selection have been much discussed since Charles Darwin and Francis Galton first turned the light of biological science upon man, and showed reason to believe that his intellectual and moral capacities, no less than his bodily structures and functions, are subject to the laws of heredity, variation, and selection, and therefore to racial improvement or deterioration. In this debate an immense mass of prejudice, of religious, humanitarian, and egalitarian sentiment, of democratic optimism, of belief in the all-sufficiency of education and good environment to conserve and advance human qualities, has stood resolutely up against the battering-ram of reason, which, with the fanaticism of science, perpetually renews its attacks. Whilst guarding ourselves against the presumption, not uncommon among men of science, to the effect that all ancient beliefs and traditions are wholly false, we must admit that the scientific argument has made out a very strong case; and we may even support it by adducing beliefs and prejudices even older and stronger than those which stand in its way, the belief in "family," in "blood," in "race," in "purity of stock," in "class" and "caste," the prejudice against miscegenation, *mésalliance*, and mongrelization.

---

[1] Lothrop Stoddard, The Revolt against Civilization — The Menace of the Underman, Scribner's, 1922, pp. 274; Shaw Desmond, Labour, the Giant with the Feet of Clay, London, 1921.

The two systems of popular belief and prejudice may fairly be set off against one another; and then the evidence that selection has played and still must play a leading rôle in the drama of human progress and decay remains such as to compel the assent even of those biologists who do not regard it as the all-sufficient agency of organic evolution. But Mr. Stoddard's thesis requires for its foundation more than the acknowledgment of this principle. The chief obstacle in the way of its acceptance by students of the social sciences is not any doubt that the human species is subject to the influences of both eugenic and dysgenic selection, but rather skepticism as to the importance for the life of civilized societies of differences between men and races of men in respect of their innate qualities. Social philosophers continue for the most part to share with the man in the street the belief that, in respect of intellectual and moral qualities, you can make silk purses out of sows' ears, if only your system of public instruction is sufficiently well organized and equipped with the most approved and expensive furniture. In America especially this belief dies hard. For the Fathers of the Republic uttered resounding phrases which have been generally interpreted as guaranteeing this popular dogma, altho the Fathers themselves acted in a way which showed that this interpretation was not justified. And yet, tho few dare frankly to question or to criticize this belief, change of practice shows that revolution of opinion is in full swing; and it may be expected that theory will not lag very far behind practice. The change is most obvious perhaps in the academic world, where the most advanced educators are making the astonishing discovery that not all young men, not even those of the highly selected group of college entrants, are equally well endowed, but rather that they differ immensely in capacities and therefore should not all be pushed through the same mill; that in fact, while some need to be pushed hard and continuously, if they are to emerge at all, others will flourish exceedingly under the most gentle guidance. This, then, is the first part of Mr. Stoddard's argument: that in the modern world there is going on a rapid multiplication of inferior types of humanity of all races and colors, while the superior types are becoming relatively and perhaps positively rarer; and further that the differences of constitution between men remain very important in spite of all the machinery of education and the elevating influences of the average newspaper. It may be expected that his vigorous presentation of the argument will prove to be another nail in the coffin of the popular dogma which equates the proposition, "all men are created equal," with the very different "one man's as good as another."

The second tendency on the reality of which Mr. Stoddard's thesis rests is the increase of the demand made by civilization upon human nature, as our modern nations grow in extent and complexity. The reality of this tendency can hardly be doubted; tho strong prejudices stand in the way of its acceptance. It is true that a large and increasing part of the labor of the industrial world is of a kind to which the high-grade moron is better suited than an intelligent and self-respecting citizen, as Mr. Arthur Pound so clearly shows in his recent *Iron Man*. As a writer in a recent number of the *Nation* truly says: "The automatic age requires an ever larger army of spiritless and simple-minded soldiers, guaranteed free from disturbing individualism and ambition."

And the economist of the strait sect, which looks only to the production of wealth in the narrowest sense of the word, may rejoice therefore in the evidence that morons are becoming absolutely and relatively more numerous. He may celebrate the coincidence of the increase of morons with the increase of moron labor as a new and beautiful instance of the working of the law of supply and demand. He may approve the wisdom of the Massachusetts Society of Mental Hygiene, which in a recent bulletin announces and endorses the declared policy of the state for dealing with young defective delinquents — a policy directing that such a delinquent shall be confined for a time for educational purposes under the explicit understanding that so soon as he shall show a certain improvement he shall be set at liberty, at liberty to produce more defectives like himself. For these, if only they be caught young and well disciplined in special schools, can, as the superintendents of such schools have proudly proved, earn good wages by steady labor of a kind which an averagely endowed human being could not long endure. Such an economist might even look forward to a time when a policy of further encouragement of the breeding of morons, supplemented by importation of large masses of low-grade population, may furnish a sufficient supply of labor of the kind required for the unlimited production of "wealth" or dividends and the rapid exhaustion of the natural resources of the continent.

But the sociologist and the economist of larger vision will hardly share this complacency. They cannot contemplate with equanimity the increase of wealth that is based upon the degradation of increasing numbers of men, nor believe that a state whose wealth, however great, rests largely on this basis can long endure. They will point out that, even tho an industrial society consisting of many well-disciplined morons and relatively few directors of high intelligence might conceivably be stable and very "wealthy," the transition to that state of affairs from the imperfect régime of the past, when all men were officially regarded as equals, must be one of great danger to the existence of civilization of any kind. That we are entering upon this dangerous transition period is essentially the burden of the second half of Mr. Stoddard's book, and this is the part for which he may fairly claim originality.

That the populations of our modern states are deteriorating owing to various forms of reversed selection has been argued by many writers. That this deterioration of quality runs parallel with an increase of complexity of civilization and hence with an increase of its demands upon the qualities of its bearers has been pointed out by the present writer. Mr. Stoddard's original contribution to the interpretation of the present stage of history is the attribution of most of the present disorders of the world to the resulting disproportion between the qualities of the mass of mankind and the increasing burdens or demands of civilization upon those qualities. The burden of civilization, he contends, has become greater than the depreciated masses can bear; hence "the revolts against civilization" and "the menace of the underman." For "the underman" is Mr. Stoddard's name for what another recent writer (Mr. Austin Freeman in *Social Decay and Regeneration*) has dubbed "the sub-man," the man who falls short of the qualities necessary for taking a full share both of the benefits and the burdens of high civilization. Such men, he maintains, exist in large and increasing numbers in all contemporary nations, owing to the processes of reversed selection, the preponderant multiplication of the least well endowed, those who under lower forms of civilization or of barbarism would be weeded out by natural selection. If the undermen were all simple-minded morons, all of them might, no doubt, be made into manageable and docile laborers; but they, or many of them, are intelligent enough to feel their inferiority without knowing it, to suffer from an "inferiority complex" which makes them restless and resentful. And, says our author, the natural discontent of these men, who groan under the burdens of civilization without having the capacity to appreciate or reap its benefits, is armed and organized by two classes of a more dangerous type, namely: (1) the high-grade defectives who have some special talent, men of the kind that Nordau called "mattoids or half-fools" and whom the modern psychiatrist would classify as mild cases of *dementia praecox*; (2) cranky intellectuals or "misguided superiors," men of ability who, through strong humanitarian sentiment or through personal misfortune which denies them a satisfactory position and career in the ranks of organized society, constitute themselves destructive critics of all existing institutions and the champions and exploiters of the discontent of the "underman."

It is these men, the Lenines and Trotskys of all countries, who teach the underman to shout for "red revolution," without any but the vaguest notions as to what is to replace the present order, and who are most directly responsible, not only for an enormous increase of crime, but also for the current demoralization of music, art, poetry, commerce, and social life, as noted by such critics as Mr. James Beck and Mr. Alfred Noyes — in short for "Bolshevism" in the wider sense of the word.

Evidence of the extent of "Bolshevism" throughout the modern world is impressively marshaled and supported by many citations from observers in many lands. The pith of the argument is contained in the following passage:

> More and more we are coming to see that hatred of civilization is mainly a matter of heredity; that Bolsheviks are mostly born and not made. How can we expect a man to support a social order which he instinctively detests or which he is congenitally unable to achieve? And how can society expect peaceful progress so long as it spawns social rebels and laggards, and at the same time sterilizes those creative superiors who are at once its builders and preservers? The fact is that construction and destruction, progress and regress, evolution and revolution, are alike the work of dynamic minorities. We have already seen how numerically small are the talented élites which create and advance high civilizations; while Jacobin France and Bolshevik Russia prove how a small but ruthless revolutionary faction can wreck a social order and tyrannize over a great population. Of course, these dynamic groups are composed primarily of leaders; they are the officers' corps of much larger armies which mobilize instinctively when crises arise. Take the present world crisis. In every country the champion of the existing order can

> count upon the resolute support of all those who appreciate our civilization and wish to preserve it from disruption. On the other hand, the revolutionary leaders can count with equal confidence upon the unadaptable, inferior, and degenerate elements, who naturally dislike our civilization and welcome a summons to its overthrow. Such are the distinctively "superior" and "inferior" groups — the standing armies of civilization and of chaos. But, even when fully mobilized, these armies are minorities. Between them stands an intermediate mass of mediocrity. . . . They also usually support the existing social order, and thus tend to oppose revolution. However, the mediocre have the defect of their qualities, their very conservatism is apt to be harmful, and is frequently disastrous. This is because it is unintelligent — a mere clinging to things as they are, . . . this is sheer *Bourbonism*. And Bourbonism is dangerous because it blocks progress, prevents reform, perpetuates social evils, breeds discontent, and thus engenders revolution. The chief danger of Bourbonism is that it is so powerful . . . the number of stupid reactionaries in high places is depressing. (Pp. 224–226.)

This view of "our present discontents" is sharply opposed to the conventional account current among the more "liberal-minded" and radical sections of society. According to this account, one man is as good as another, and the revolutionaries are merely voicing the natural resentment of good men against the injustices of the social order. All that is needed to produce universal contentment is that the "possessing classes," an hereditary caste of utterly selfish and depraved persons, shall be dispossessed, and the direction of society placed in the horny hands of the sons of toil; for they, being by nature virtuous and unselfish, will see to it that every man has his due and something more.

Mr. Stoddard's diagnosis will be scornfully stigmatized in many quarters as a typically bourgeois production. And, indeed, Mr. Stoddard makes no profession of sympathy with the downtrodden and oppressed. There is a certain detached and Olympian quality in his incisive exposition. It is interesting therefore to compare his account with that of a writer of very different experience and attitude. Mr. Shaw Desmond has long been a very active worker among those shifting allied groups which in Britain are now comprehensively spoken of as the "Labour Party" and which comprise all shades of radicalism, socialism, and syndicalism. His sympathies are still strongly with these groups; and he seems to be, or to have been, personally, intimately, and more or less sympathetically, acquainted with all or most of the leading figures of these groups in the last twenty years. He seems to be, or to have been, an excellent representative of a type increasingly abundant in Britain, namely, the young intellectual who from generous motives throws in his lot with the proletariat. His long and rich experience of these groups leads him to write of them with a certain disillusionment; and, tho his writing is often loose in expression, he reveals in his last book a remarkably clear insight and ripe wisdom. His experience has shown him that the simple formulae with which he set out to reform the world, in common with other enthusiastic soap-box orators, do not suffice. "We assumed," he writes, ". . . that the Democracy would advance peacefully and steadily by education and the vote; and, that last strange delusion, that once the poverty problem was solved, all our intellectual and spiritual problems would be solved with it. . . . I think we ignored almost everything that was vital in humanity as we ignored everything that was inconvenient to our theories. . . . Our assumptions sprang, however, from an idealism and a fanaticism which refused to face facts. . . . We forgot that 'man does not live by bread alone.'"

Mr. Desmond has made discoveries which have shown him the error of many beliefs common to the labor groups, have shown him among other things that the Marxian formulae are mere stupidities, like all other economic and social formulae which are based upon hasty assumptions as to the nature of man. In short, his experiences have made him a psychologist, who sees that true conceptions of human nature and of its varieties must be the essential condition and foundation of all social theorizing; that it is not sufficient to assert that human nature is what we should like it to be; that the fancy picture of the noble proletarian panting for leisure to be spent in art galleries and museums is as poor a foundation for economic theory as the "economic man" of the classical economists, and must as certainly lead to absurd conclusions.[2]

Mr. Desmond has learned that one man is not as good as another; "the fact is that only a tiny percentage of human beings in any class are capable of conscious thought." He has learned that men differ not only by reason of differences of economic circumstances: "Men and women are united and divided by feeling, by temperament, rather than by brute economic or by class, that is something which Labour has yet to learn." "The new movement," he writes "will frankly recognize that men and women never have been equal nor ever will be, and it will recognize that only just so far as this recognition is made is a true democracy possible." And again: "In all movements, and more especially in all democratic movements, it is a handful of men and women who steer and inspire. Democracy itself is always steered by autocracy. This is true also of the labour party." Here Mr. Desmond agrees with Professor R. Michels who (in *Die Sociologie des Partei-wesens*) has written despairingly of democracy, because his experience as a worker in the social democratic party has convinced him of this truth, that power inevitably falls into the hands of the ablest and most energetic few. But Mr. Desmond, unlike Professor Michels, does not despair of democracy. He has the rare capacity to face the facts of human nature, to resign the fallacies of the egalitarian democrat, and to realize that a democracy that is to succeed must temper the purely democratic spirit with the spirit of true aristocracy. "Men and women of imagination, still keeping alight the sacred fire which illuminated the pioneers of labour, are, all unconsciously, beginning to evolve the New Democracy! It is a democracy which, dropping the catchword 'Equality' and observing that men and women are enormously varied in quality, development, and effort, is gradually recognizing the principle of ' spiritual aristocracy.' It is upon these men and women . . . that the future of democracy depends. It is that ' eternal minority ' from which all progress comes. " "The only justification of Democracy is that it elect leaders superior in brain and spirit to the rank and file who elect them. . . . If the mass can not or will not elect the master mind, then democracy will be thrown on the scrap heap of evolution as one more experiment which has been tried and failed." "Even under the Democratic State the only claim to leadership will be the claim of spiritual aristocracy and spiritual superiority — not merely the claim, but the fact."

---

[2] I well remember a speech on a notable occasion by Mr. Philip Snowden, generally acclaimed the most intellectual and hard-headed of the socialist orators of Great Britain. The essence of his argument was—human nature is thus and thus, and, if you doubt it, you are a cynic. A most effective form of argument and one which is the essential foundation of most socialist theories.

Another fallacy which prevails among the intellectuals who sponsor the labor party, as well as among the rank and file, is rejected root and branch by Mr. Desmond, who in this also shows a capacity for right thinking astonishing in a man of his antecedents and sympathies; namely, the fallacy of "internationalism." Mr. Desmond has learned that true internationalism means the mutual respect and friendly cooperation of stable nations, and that such internationalism is not to be achieved by destroying nations, or by breaking down all national distinctions. What is commonly called "internationalism" and advocated under that name by the blind leaders of the blind who decry nationalism and abhor patriotism should more properly be called " cosmopolitanism." The confusion of these very different things, "internationalism" and "cosmopolitanism," is a vulgar error committed by many who might be expected to avoid so simple a fallacy. This is clearly seen by Mr. Desmond. He rightly rebukes the folly, the lack of psychological insight, of the apostles of the "world state" that is to supersede immediately our obsolescent nations: "When Mr. H. G. Wells . . . insists that the quick establishment of 'the World State of all Mankind' alone can prevent civilization from perishing, he is asking for the impossible. . . . These things are today impossible and unattainable and incomprehensible for two reasons and two only: first, Nationality is still the most powerful driving force in the world; and secondly, an International World State will only be possible when each unit composing it is that of a fully conscious nation, proud of its nationhood and fully realizing the significance of nationality." "Men who have no love of country and no patriotism are of no use in the International Building to come. No man can be Internationalist before he is Nationalist. A man who has not learnt the cohesion of country is not likely to learn the greater cohesion of countries. The man who has not learnt to live and move and have his being through the soul of a nation is not going to do so through the International Soul." "This reaction in its turn will presumably guide to the Higher Collectivism and to a genuine Internationalism, both founded in a conscious individualism as in a conscious nationality, and both animated by that aristocracy of spirit which will replace the aristocracies of blood and of money."[3]

What then of the British Labour Party "the giant with the feet of clay"? It has one great virtue — it is, in spite of the foolish theories of the intellectuals who have attached themselves to it, fundamentally patriotic; "The British worker is still, not violently but quietly, surely, insular and national, fundamentally unchanged throughout in the mass throughout the years. The Great War proved it to the hilt." But the party has many faults. In the first place it still hugs all those fallacies and delusions which Mr. Desmond has discovered for himself and so courageously rejected. Its devotion to these will not, however, explain all the weaknesses which Mr. Desmond ruthlessly exposes to the gaze of a bourgeois world, a world which not long ago seemed to accept with resignation the near prospect of a Labour Government.

Speaking as a member of the labor group, Mr. Desmond complains of its absence of a considered policy on such great issues as the value of patriotism and religion and idealism. "Then came the war and knocked our theories into a cocked hat. . . . Our leaders had never been clear about country and patriotism. We were not very clear about anything. . . . We hated facing facts." And the trouble is not merely intellectual; the hugging of fallacies and the lack of thought-out policies. It is moral also. The Labour Party is given up to the policy of "loaves and fishes," of "less work for more pay," of limitation of production. "The [labor] movement as a whole is inchoate, lacks constructiveness, is bankrupt in spiritual driving force, and tends more and more to exalt the material at the expense of the finer things of life." He cites with approval the following verdict: "Labour's opponents believe they will always be able to sidetrack labour, and they believe it with full justification, having regard to labour's record. So many of the labour leaders are out for themselves. And they lack imagination and enthusiasm. Few of them can resist a job, still fewer flattery." Nor is it the leaders only who are imperfect. Mr. Desmond avoids the popular socialist fallacy that all who hold office or power are naturally bad, and all who do not are noble and generous and incorruptible. He criticizes the rank and file as well as the leaders. "The striker usually strikes because the other fellow strikes . . . not because he has any political creed or because he wants to be a saviour of society. He wants to save himself." Our author does not mince his words; he sees so clearly the defects of both leaders and followers that he is moved to write of "the rotting body of the labour party." Labor parties, leaders and masses, being what they are, what Mr. Desmond shows them to be, "is it not assured," he asks, "even as today almost every country in Europe where labour is moving to power has shown it, that the bureaucrat [the labour leader] will fast pass into the autocrat, impregnably intrenched behind his 'official' bulwark, finally reaching what seems to be the inevitable goal of democracy in our time — a dictatorship." But this is contingent upon the appearance of a man with the qualities of a dictator. Pending his appearance, three possible roads lie before Democracy, says Mr. Desmond.

---

[3] These and other utterances of Mr. Desmond's would tempt me to suppose that he had studied my "Group Mind," were it not made clear that he has discovered these truths, not by any academic route or by any deduction from psychological principles, but rather through twenty years of strenuous participation in the rough and tumble of socialist and labor agitation. Mr. Desmond, in fact, seems to be one of those rare cases of men who learn political wisdom by taking part in practical politics, by discovering through painful experience the fallacious nature of the principles they had enthusiastically embraced.

First, the road of direct action, now so largely in favor. That way lie madness and chaos and all the horrors of Russian Bolshevism. The war "has shown that nothing is impossible, not even that infinitely greater cataclysm which will come inevitably if Demos take the road of Direction Action." For he recognizes that the danger of such men as Lenine and Trotsky "lies not in their power to wage successful revolution . . . but in their power to send civilization crashing to the dust."

The second road is that of the "mass vote"; by which he means the substitution for representative democracy, which aims at choosing the best men as its representatives and submitting largely to their guidance, of the principle of delegation and an equal influence for each man. The realization of this, the ideal of pure democracy, would be equally fatal. "If, however, Democracy persists in the sand-bagging of society by the 'mass vote,' we should see, not the crashing of a civilization, but its crumbling. We should see a sclerosis of civilization extending over a lengthy period with, at the end, a degradation and intensive dry rot from which it might take the White Race centuries to recover."

The third road is that of "self-development and spiritual democracy." After pointing to the failure of many experiments, Mr. Desmond writes: "What all the experimenters have forgotten is that the *ultimate factor of the labour problem is the factor of the human being himself. . . . As the man is, so will the system be. . . . There is no solution for labour unrest, beyond the building up of human character. . . .* When he [Demos] has developed all those qualities which today he lacks, his character will be changed, and when his character is changed the system will be changed, for only then will he be able to effectively use the numerical strength which today is but a weakness." And again: "Lack of education and unconsciousness [and the latter term can only be taken to mean lack of intelligence] constitute that paralyzing atmosphere which prevents the labour masses, hitherto, on the political or industrial field, in Great Britain or outside it, from getting anywhere."

Here, then, is a diagnosis from inside the labor movement, strangely like Mr. Stoddard's. For Mr. Desmond's ultimate verdict is that all the various groups that roughly fall under the label of "Labor" are ineffective for good, and rather threaten civilization with speedy and red ruin, just because they are lacking in intellectual and moral qualities. Mr. Desmond, it is true, has not apparently entertained the notion that perhaps these qualities are not displayed just because they are not there. He seems still to retain a vague belief that the necessary qualities are latent, only needing the magic touch of education to bring them into operation. Like our enthusiasts for more and more schooling, who are always scornful of what education has done already and exuberantly confident of what it will do when they shall have effected the necessary reforms, shall have put into effect their own peculiar fads, he neglects to consider the biological problem. In spite of his admirable desire to "face the facts," his courage and honesty and clear sight, he has not yet faced what, if not an established truth, is at least a possibility, namely the view represented so confidently by Mr. Stoddard—the view that "labour" is composed in the main of those individuals and those strains which have failed to climb the social ladder, just because they are innately lacking in the capacity for doing so. Is there any other explanation of the ineffectiveness which Mr. Desmond exposes, of the failure of labor to produce men capable of great leadership, men who could make the party a great political force exerting an influence commensurate in some remote degree with its immense numerical strength?

There would seem to be only two alternative explanations: either the mass of labor is so extremely lacking in intelligence that it cannot recognize and appreciate men of superior qualities when they appear within its ranks, or there is a great dearth of such qualities among them. There seem to be no indications in favor of the former alternative. Rather the evidence is all the other way. The labor man who manifests a combination of good intelligence with strong character rises rapidly to power within his party; and figures as a giant among his fellows. Then he enters Parliament or attains some other position in which he is matched against other men not of the labor party. In Parliament he is treated with the greatest indulgence; the dice are loaded in his favor; he represents the enormous voting power of the "working classes." Yet always hitherto he has disappointed the extravagant hopes of his party. He quickly finds his level. The most outstanding of them, such as honest John Burns and Sir David Shackelton, become faithful and capable administrators of some minor office. They are then reproached by their party with having gone over to the bourgeois class, as indeed they have; for experience and responsibility have taught them the stupidity of the theory of the class war, and that a man's highest duty is to serve not his "class" but his nation. Indeed, it would seem that the British Labour Party has tacitly admitted the truth of this interpretation in recently opening its doors and welcoming to its fold the brain workers, who a generation ago were regarded as necessarily of the despised bourgeois. This is no doubt a movement to be welcomed by all, altho and because it is an implicit recognition that labor cannot stand alone and a practical repudiation of the dogma of the class war.

The history of the labor party in Britain, as revealed by Mr. Desmond, affords, in short, strong confirmation of the view that for the British laboring class the gate of career has been so long and so widely open to the talents that most of the talents have passed through it and few remain within the fold. By Mr. Desmond, as by so many others, this view seems never to have been entertained as a possible hypothesis. For the belief that mute inglorious Miltons and Lincolns still hide their talents in every large workshop still prevails. He calls for more education and a sterner self-discipline. Excellent things no doubt; but the capacity for stern self-discipline is not made to order or to exhortation however eloquent, but is inborn. And there's the rub. Our two authors, then, approaching the great problem of our time along very different lines, point to the same conclusion: Mr. Stoddard in the most emphatic and explicit manner; Mr. Desmond by implication only, because he stops short before drawing that inevitable conclusion. That conclusion is that the wealth and continued prosperity and stability of a nation are functions of the inborn intellectual and moral capacities of the population; and that our civilization is in very real danger, because more and more our societies breed from the bottom and die off at the top, because the drastic and cruel selective death rate of natural selection has given place to a selective birth rate, a form of selection which (tho it might by intelligent direction be made to promote vastly the welfare of mankind) at present operates strongly, as so often in the past, towards the destruction of all the gains made by the intellectual and moral efforts of countless generations of mankind.

Mr. Desmond's conclusions about the British Labour Party cannot be simply transferred to labor in America. For conditions are very different. It may be that here labor has been less completely depleted by the social ladder; it may be that immigration has brought it on a large scale new elements of potential strength which have not yet climbed the ladder. But there is not much ground for any such suppositions. The differences would seem to be mainly these two: first, that patriotism can hardly be so deeply rooted in the mass of American labor as in the British, for a large proportion of American labor is still only very partially Americanized. It has taken many generations of national life to consolidate the mute but effective patriotism of the British masses. Secondly, American labor enjoys a much higher level of material prosperity, of opportunity, of variety. Is it possible to foresee how the industrial masses of America would react, if they were deprived of their immense advantages and reduced to the economic level of British or European labor? Yet one of the main conditions of the superior advantages of the American laborer in the past must either be withdrawn or, if it continues, must itself automatically destroy much of that superiority. I mean the stream of immigration supplying hands to do the rougher and less well-paid work, and to form a stratum of society on which the American workingman can look down with the feeling that he himself is rising in the social scale, thus diminishing greatly for him the risk of developing a disturbing "inferiority complex."

W. McDougall.

Harvard University.

KNIGHT'S RISK, UNCERTAINTY AND PROFIT[1]

A good idea of the subject matter of the book is conveyed by a description of its three parts. The first, of about fifty pages, is methodological and historical, and is labeled "Introductory." Part II, "Perfect Competition," runs to nearly one hundred fifty pages, and elaborately utilizes the defense of the abstract method made in Part I. Part III, called "Imperfect Competition through Risk and Uncertainty," approaches two hundred pages in length and contains the author's constructive contribution.

Of the two chapters in Part I, the methodology of the first is unduly self-conscious. The historical notes constituting the second chapter are in due proportion, since the book does not profess to be a history of the theories of profit. The length of Part II is naturally associated with the introductory emphasis upon the abstract method. A high degree of abstraction involves the enunciation of principles that are nearly, if not quite, self-evident, since testing out and proving them is precluded. It seems, therefore, that spun-out abstraction becomes either the elaboration of the obvious or the bald assertion of the unconvincing. There are elements of both these things in Part II. There are other things in these chapters beside the abstractions, some of which lead up to the constructive theory. The book would have been better constructed, in the reviewer's opinion, if the whole ground of Part II, together with Chapter I, had been covered in a single chapter. Of course this would have involved omissions. One subject that could have been omitted without loss would be the discussion of utility, to which subject the reviewer will return.

---

[1] Frank H. Knight, Risk, Uncertainty and Profit. Boston and New York, Houghton Mifflin Company, 1921. Pp. 381. $3.00. (Hart, Schaffner & Marx Prize Essays, Vol. 31.)

The book could also have been made much more intelligible by the frequent use of section heads. It is divided into twelve chapters that average over thirty pages each. The abstract nature of the discussion makes topical subdivision rather necessary. An index of less than three pages and a table of contents of less than four are, under the circumstances, not good as substitutes for section heads, if, indeed, they are adequate to their immediate purposes.

The above criticisms are of minor importance and interest compared with the constructive contribution the author makes. But the substantial value of the treatise is in Part III, and it is perhaps doing a favor to the author as well as to his public to suggest that the reader who is tolerably well-read in economics can practically ignore the first two parts, altho they contain evidences of astute thinking as well as of comprehensive reading in the literature of economics.

It would be desirable to quote from the book a summary of the author's conclusions regarding the nature of profit and of the entrepreneur's function. But no such summary is offered, hence the reviewer will attempt something of the sort. Profit is stated to be related to risk and uncertainty. With uncertainty eliminated there would be no profit. Risks, however, can be reduced by various means, especially by insurance or by their grouping and averaging. But there remain other uncertainties which the entrepreneur cannot eliminate, so far as they affect him, by paying an insurance premium. These are distinguished as uncertainties, risks not being uncertain when grouped. Uncertainties can only be dealt with by the exercise of judgment, the processes of which are largely unanalyzable, such judgment being a gift or special faculty. It may be exercised for hire to a greater or less extent, in which case the entrepreneur is he who chooses the one to exercise judgment. In the case of a corporation — which is recognized as a crucial problem in the task of identifying the entrepreneur — there is a graded series or system of exercises of judgment. The judgments become to an increasing extent a matter of selecting others to deal with the objective uncertainties until the general manager or president is reached, who is chosen by the directors, who in turn are chosen by the stockholders. The latter are the real entrepreneurs, not only in the sense that they take the consequences of uncertainty but also because they assume the ultimate responsibility by their acts in choosing the managers. They need know nothing of the business carried on by the corporation, their task being merely to choose men that have the qualities required for its operation.[2]

It seems to be almost a necessary defect of the quality of originality that a new theory be supposed by its author to contain more of the truth than it does, and usually all the truth. So far as the reviewer knows, Professor Knight has presented an original, as well as an important, theory. To say that he overestimates its explanatory scope is not a severe criticism, unless all the importance it has in his conception is due to overemphasis.

One important element of strength in the theory is its attempt to find the entrepreneur under conditions where business is conducted mainly by corporations. No textbook with which the reviewer is acquainted (he has read none for some time) squarely meets the problem presented by this situation. Professor Knight offers a well-reasoned argument for identifying the stockholder as the entrepreneur. Previously economic theory has usually indicated the manager as the entrepreneur, altho the point was not likely to be clearly made and was not often consistent with the theory of profit held. To meet this problem squarely is a great step in advance, even tho the solution offered is not complete and final.

[2] "The *crucial* decision is the selection of men to make decisions." P. 297. "It is the margin of error in the exercise of this most ultimate faculty of judging faculties whose exercise is the essence of responsible control, which constitutes the only true uncertainty in the workings of the competitive organisation." P. 311.

Professor Knight shows he has read broadly and thought effectively in the literature of corporate organization and finance. His view of the importance of the stockholders in selecting corporate leaders, and in even thus indirectly determining corporate policies, might, at least as applied to American conditions, be called *naïve*, but is probably to be attributed rather to his zeal for his own theory. Certainly in many corporations the directorate is practically chosen by coöptation (perhaps under banker dictation), tho the self-perpetuating oligarchy is tempered by legal provision for revolution. Moreover, the author does not hint at the employment of corporate organization as a device of salesmanship. Business enterprises are still largely organized and built up as individual or partnership affairs; and are incorporated when the owners wish to sell. But it is consistent with Knight's theory that stockholders may serve better as entrepreneurs in the conduct of an established business than in the formative period.

The competing conception with which this theory must presumably effect a merger is a price-difference or speculative theory of the place of the entrepreneur. A speculator who buys on margin and whose stock is held and voted by his broker can hardly come within Professor Knight's conception of an entrepreneur. A speculator in the futures of the produce markets is even more definitely not concerned with judging human capacities and choosing men but merely with sheer price differences. He sometimes disburdens others of uncertainties (when he takes the other end of their hedges) and he is always seeking profits that are uncertain.

In fact, the speculator appears to be the entrepreneur abstracted from *doing* anything that is constructive. The stockholder's relation to production may be quite similar. But if he buys for investment, he will make up his accounts differently and income and outgo will be largely made up of dividend receipts and interest payments. The moot point is whether the kind of uncertainty with which the speculator deals is not more nearly typical of the entrepreneur's activity than the kind of uncertainty which the author exploits.

Professor Knight both digs rather deeply into the foundation of the theory of profit and also occasionally digresses beyond matter having any particular relation to the subject. In one way or the other — it seems rather unnecessarily — he devotes considerable attention to the subject of the nature of utility. The opinions expressed are such as the reviewer cannot fail to deal with critically.[3]

The author's views upon this subject are developed especially in the first chapter of Part II, entitled, "The Theory of Choice and Exchange." The essence of his position is that there is no utility that does not find expression in price. For example, he says: "The earlier units are no different from the later ones . . . ; up to a certain point the balance is positive, then it suddenly becomes negative . . . ; each [unit] is worth what it costs, but also costs what it is worth." (p. 71). The subject of the paragraph is warrant for taking "worth" as meaning utility. Another illustration of the author's viewpoint (and of its weakness), is the statement: "If the thing itself is not wanted somewhere else it will not have (exchange) value, and we should not even say utility if the word is properly defined" (p. 93). It is quite true that, if utility is made synonymous with exchange value, whatever has been done with utility in the field of the economics of consumption is vain. But utility has not in fact been so defined or conceived. What the statement means is that the author has no use for the idea of utility. That rather disqualifies him from saying what is a proper definition. The frequent reference to *economic* utility (which may reasonably be translated marginal utility), and to importance and worth as synonyms of utility, may be taken to mean, not merely that the author does not himself wish to deal with the economics of consumption, but that he is also reluctant to have others do so.

Elsewhere "*utility* in the economic sense" is said to be equivalent to "power over conduct" (p. 61). This seems to be broad enough, tho apparently it is the basis for the statement made in the same paragraph that "ascribing economic utility [4] to free goods" is "a pernicious error." If all conduct be reckoned cost, and if the ascription of utility be refused where there is no effort, the statement is plausible. But the reviewer would say that a cool breeze on a hot summer day has utility, even tho there be enough for all and to spare. Even if one must go to a nearby elevation to obtain the benefit, to call it an economic good would hardly seem warranted. Fresh outside air is perhaps never an economic good, tho the means of obtaining it doubtless are. Of course liquid air is an economic good. It is true that many free goods cease to be consciously reckoned with and sought; but to refuse to recognize their possession of utility is no more a necessary consequence than is the denial of the material existence of the air a logical consequence of its not ordinarily being visible, tangible, etc. Apples seem to have utility to the farmer's boy even when they are to be had in superabundance.

---

[3] Professor Knight is acquainted with the writer's book, Welfare as an Economic Quantity, but does not mention it, possibly because its mention would necessarily be controversial.

Even if consciousness of the utility of free goods is in most cases potential rather than positive, that is no sufficient reason for the allegation that they have no utility. The zero of want or utility or affection should doubtless not be thought of as an absolute zero or analogous to a vacuum, but rather as a level of feeling which is determined in part by use and habit.

The more important practical aspect of the denial of the existence of super-marginal utility arises in connection, not with free goods, but with goods having economic value, and especially with such as are more or less unique or distinctive in the particular individual's economy, instead of being units of a homogeneous supply. It is rather disconcerting to have to argue about the proposition that, in Adam Smith's words, value in use may often exceed value in exchange. Does a smoker feel that his pipe has less value after it has been well seasoned? Will he not spend a half day looking for the old pipe while giving no further thought to the loss of a new one? Nor is the utility of a seasoned pipe a personal idiosyncracy; it is a general phenomenon. What is in the mind of a shopper who on occasion says she would not give a cent more for a certain article bought, and under different circumstances that she would be willing, if necessary, to give (for a different sort of article) twice as much as she actually pays? Most durable goods are not units of a homogeneous supply but are in varying degrees distinctive at least, and often unique in the individual economy.

---

[4] The confusing, if not question-begging adjective, is commonly used by the author. One would be warranted in supposing "economic utility" and "economic goods" to be parallel conceptions.

Even as regards a good that is homogeneous, it does not seem to the reviewer that salt, for example, will be thought of in any family as having only such utility as it may possess in the lowest-ranked use to which the head of the family might on occasion be ready to put it (perhaps to reduce the danger of falling on icy steps). The force that attaches to the denial that "there is a difference between utilities of different portions of supply" (p. 62) is entirely dependent upon the technical fact that definite physical units cannot be identified as devoted to particular uses. But for some purposes such physical identification is not necessary. Which has the greater utility, a pound of salt or a pound of pepper?

Professor Knight suggests that he is a follower of Wicksteed and Fetter (footnote on page 64) in his avoidance of hedonistic terminology and implications. His position is in effect a refusal to consider what is behind the facts of choice. There is no particular occasion for criticism of this attitude if adopted as a sort of methodological self-denying ordinance. It would perhaps, also, not matter that the position is consciously anti-hedonistic, but for the fact that its negations are much broader.[5]

Preceding or accompanying a conscious choice are mental processes which constitute or include a judgment of value.

---

[5] Wicksteed, as read by the reviewer, successfully avoids the employment of the term utility and does not lay himself open to any of the criticisms above made. His discussion fully recognises the *fact* of super-marginal utility. He is not antagonistic to a hedonistic explanation of choices in part, but definitely makes room for other possibilities.

The judgment of value is by no means concerned merely with economic values, and when dealing with economic goods, tho frequently affected reciprocally by knowledge of pecuniary and commercial values, takes into consideration any elements of utility that appeal to the subject regardless of whether they find expression in price or not. It is not common sense to say that the utility of a boy's jacknife is proportioned to its price. It is contrary to common sense to say that the utility of any familiar article of use and enjoyment is measured completely by its objective or subjective exchange value. Difficulties of measurement or of quantitative estimation, of course, there are, but to him who would deny the existence of the hippopotamus[6] because its image is not easily assimilated, the advice is to learn better. There are quantities not readily measurable in yards, pounds, quarts, dollars, etc., and they are important for economics. Just as the notions of the so-called spiritualists are often grossly materialistic, it appears that anti-hedonism can be astonishingly gross.

There are a number of incidental expressions in the book that are irritatingly overdone. The suggestion that the distinction between earned and unearned income is futile (pages 128 f., page 170, footnote on page 180) can scarcely be ignored. It is true that what a man earns depends largely upon inherited ability and upon the educational and other advantages his parents and his community have given him and it is true his property may have come to him in the same way. But, if he earns his own salary but not his brother's salary, it would seem that it may also be said that he earns the income from his labor but not the interest on bonds he has inherited from his father.

The reviewer regrets the extent to which his comments have been critical. The outstanding fact about Professor Knight's book is that the author has made a contribution to the theory of profit that no student of the subject can afford to neglect. Nor is the merit of Part III confined to the main idea. The first chapter of the part on the Meaning of Risk and Uncertainty, for example, shows a breadth of conception which cannot be expected of the mere economist. The reviewer does not find in the epistomology here exploited such scholastic quirks as mar other parts of the book.

---

[6] All have heard of the farmer whose reaction to his first sight of a hippopotamus was expressed by his exclamation: "There ain't no such animile."

G. P. Watkins.

Washington, D. C.

NOTES AND MEMORANDA

MOORE'S WORK IN CYCLES: A REVIEW

In 1914 appeared a stimulating volume by Professor H. L. Moore entitled *Economic Cycles: their Law and Cause.* This volume was an attempt to show that the familiar economic cycles of business expansion and depression had their origin in physical phenomena — an attempt at once recalling Professor Jevons' earlier suggestion of a relation between these same economic cycles and sun spots. Professor Jevons' theory, however, would make the length of the cycle approximately eleven years, while that of Professor Moore is based upon a rainfall cycle of eight years.

Since the above-mentioned volume appeared, Professor Moore has continued his studies with enthusiasm and great industry. Students of his method, in addition to the volume above referred to, should read the following articles from his pen: "Forecasting the Crops in the Dakotas," *Political Science Quarterly*, June, 1919; "Crop Cycles in the United Kingdom and in the United States," *Journal of the Royal Statistical Society*, May, 1919; "Crop Cycles in the United Kingdom and in France," *ibid.*, May, 1920; "Generating Cycles of Products and Prices," *Quarterly Journal of Economics*, February, 1921; "Generating Cycles Reflected in a Century of Prices," *ibid.*, August, 1921; and "The Origin of the Eight-Year Generating Cycle," *ibid.*, November, 1921.

The above articles aim to be progressively corroborative of his main thesis, which, in brief, is as follows: An application of Fourier's analysis to rainfall data in the Ohio valley and in Illinois was believed to demonstrate a recurring eight-year cycle superposed upon a thirty-three year cycle. These rainfall cycles were then by an application of Pearson's formula for correlation found to correlate positively with crop cycles and negatively with price cycles. An essential feature in this part of the investigation was a study of demand curves and the relation of crop cycles to price curves. Having once discovered what appeared to be an eight-year cycle of rainfall, Professor Moore in his subsequent articles adduces corroborative evidence of the soundness of his theory by the further discovery of approximately eight-year cycles in crop yields and crop prices in the United States, 1882–1918, with a strong negative correlation between the two series, and, in the same article, demonstrates eight-year cycles in the case of coal and iron production and in raw materials for manufactures.[1] Again, a study of Sauerbeck's index numbers of general wholesale prices, 1818–1913, yields the familiar eight-year cycle,[2] as does also the data for yield per acre of representative crops in the United Kingdom since 1884 [3] and in France.[4] Moreover, the cycles of crop yields in the United Kingdom, in France, and in the United States were found to synchronize. Finally, he quotes from the work of Professor A. E. Douglass, *Climate Cycles and Tree Growth*, in which a study is made of tree rings, in Arizona and elsewhere, in their relation to rainfall, and finds in this remarkable investigation further evidence substantiating his theory.[5] He quotes from an article by H. W. Clough of the United States Weather Bureau, entitled "An Approximate Seven-Year Period in Terrestrial Weather, with Solar Correlation" [6] and also from an official publication of the Weather Bureau, "Report on the Barometry of the United States, Canada, and the West Indies," in which the record of barometric pressure is found to indicate cycles, and an interval of about eight years is found to exist between periods of maximum pressure and like intervals between periods of minimum pressure.[7]

---

[1] Quarterly Journal of Economics, February, 1919.

[2] Ibid., August, 1921.

[3] Journal of the Royal Statistical Society, May, 1919.

[4] Ibid., May, 1920.

[5] The quotations from the work of Professor Douglass, as they are made to appear in the Quarterly Journal of Economics for November, 1921 (p. 10), are as follows: "'The interval from 1830 to the present time divides . . . fairly well in (a period) of 7.3 years' (p. 108). As to the whole record of 500 years, he says, 'a 7-year period is also frequently observed' (p. 101). In Table 8 (p. 108) Professor Douglass indicates that his cycle of approximately 7.3 years has been continuous since 1817." It will be noticed that even in these quotations Professor Douglass makes no mention of an eight-year cycle.

[6] Quarterly Journal of Economics, November, 1921, p. 14.

The work of Professor Moore shows an immense amount of painstaking research, and yet in spite of the great wealth of apparently corroborative evidence, I regret to say that I find the work unconvincing.

In the *Quarterly Journal of Economics* for May, 1915, I reviewed Professor Moore's first volume, *Economic Cycles: their Law and Cause,* and was led to question the soundness of his conclusions. I observed that "the eight and thirty-three year cycles were derived from data as to *annual* rainfall, while the whole argument rested upon *effective* rainfall at the critical periods of the growth of the several crops considered." Professor Moore failed to correlate these two. I then discovered that while the data for annual rainfall revealed a fairly well-marked cycle of eight years, the periodogram for effective rainfall showed only very minor indications of an eight-year cycle. There was in the latter case slightly more indication of a seven-year cycle and some indication of a seven-year cycle in the case of the yields per acre of nine principal crops. But in the case of prices the indications were better for a nine, or even a ten-year cycle. Graphs constructed to the seven-year cycle for crops and the nine-year cycle for prices showed an excellent fit.[8] I am repeating here these criticisms from my former review because the whole superstructure of Professor Moore's theory rests upon an *effective* rainfall cycle of eight years and its correlation with crops. It is the "generating cycle" having its origin in non-economic causes upon which all the subsequent economic cycles are made to depend. Therefore, before the rest of the theory can be given much credence, the eight-year cycle of effective rainfall must be firmly established and this Professor Moore has failed to do.

But in his subsequent work, taken by itself without reference to the basis of effective rainfall, there are many matters that call for explanation. I shall select for critical study only a few. In the August number of the *Quarterly Journal of Economics*, a study is made of Sauerbeck's table of index numbers of wholesale prices from 1818 to 1913. This table covers a period of ninety-five years. In it an eight-year cycle would be repeated eleven times. Hence if such a cycle depended upon some regularly recurring natural phenomenon the evidence for it should be unmistakable. Therefore, it has seemed better, in the compass of a review, to make a somewhat detailed study of this table rather than to attempt an exhaustive treatment of all of the alleged cycles discovered by Professor Moore.

---

[7] Quarterly Journal of Economics, November, 1921, pp. 16, 17.

[8] Ibid., May, 1915, pp. 634–637.

In the first place, the method of attack is to me unsatisfactory. There is a tendency to apply formulas with uncritical confidence. The successive steps of the process are not enough subjected to the test of observation, independent thought, and reason. Availing himself of a method suggested by Professor Turner, he first regards the whole period as a single cycle of ninety-six years, which cycle he computes and fits to his crude data. He then computes the amplitudes of cycles whose periods are the harmonics of ninety-six, i. e., 48 (one-half of 96), 32 (one-third of 96), 24 (one-fourth of 96), 19.2 (one-fifth of 96), etc., and from the amplitudes so computed selects those of considerable magnitude as referring to periods which may reasonably be assumed to indicate true cycles, and finally he superposes the cycles for such periods one upon another until he evolves a wavy line approximately congruent with his crude data.

Now to employ such a method as this is deliberately to reject the aid which a graphical method affords. One of the chief advantages of a graphical method is that the direct perception of the eye affords suggestion to the reason. These suggestions of the eye must, of course, be mathematically tested and verified, but that is no reason why one should refuse to avail oneself of their aid. The first graph of the crude data makes no suggestion of a ninety-six year cycle, and when such a cycle is constructed it is for more than a third of its course the absolute reverse of a good fit. And why should forty-eight years be selected as the next cycle period in order after ninety-six? It is evident to the eye that the whole period of ninety-five years divides itself roughly into two cycles. But why select forty-eight, rather than forty-nine or fifty? As a matter of fact by a method to be presently explained it was found that fifty-four was the most likely period.

But even if we accept the method of harmonics — and undoubtedly if persisted in far enough it will lead to a curve approximating the crude data — there is one application which he makes of it which is entirely inadmissible Because there are rather large values of A^2 for 8.7 years and for 7.4 years he assumes that the parameter of these cycles may be used for computing the parameters of a cycle midway between them, as follows:

> The eight-year cycle which is representative of the Sauerbeck residuals in Figure 6 was computed from these two equations in the following way: Its period of eight years is the mean of the periods of these two cycles, $\frac{8.73 + 7.38}{2} = 8.05$; the amplitude of the eight-year cycle is the mean of the amplitudes of these two cycles,
>
> $$\frac{3.8 + 3.1}{2} = 3.45;$$
>
> and the phase of the eight-year cycle is the mean of the phases of the two cycles, $\frac{9^\circ + 92^\circ}{2} = 50^\circ\ 30'$.[9]

It is singular how Professor Moore could have rested his case for an eight-year cycle on such reasoning when in his own table on page 525[1] he had directly before his eyes the square of the amplitude of the eight-year cycle, 2.12, the square root of which, or the amplitude of the eight-year cycle, far from being 3.45, is only 1.45. The method is demonstrably false. Suppose our crude data formed the ordinates of a perfect cycle whose period was eight years. Now suppose we used these ordinates as the crude data to which were to be fitted cycles whose periods were respectively between eight and nine years and between seven and eight years. Obviously, these cycles being a poor fit would both show a less amplitude than that of the eight-year cycle which was a perfect fit. Hence the mean of their amplitudes could not be equal to that of the eight-year cycle but would be less. As will presently be shown, a cycle of nine years shows a larger amplitude than either 8.7 years or 7.4 years, viz. 4.143, the square of which is 17.16. That is, the cycle of best fit lies between the harmonics 8.7 years and 9.6 years, with an amplitude greater than either of them, as, in theory, it should be. I think it not unlikely, judging from the appearance of the graph (tho I have not made the computation), that a cycle of fairly good fit for a portion of the distance would be found to lie between the harmonics 6.9 years and 7.4 years with an amplitude greater than either.

---

[9] Quarterly Journal of Economics, August, 1921, p. 522.

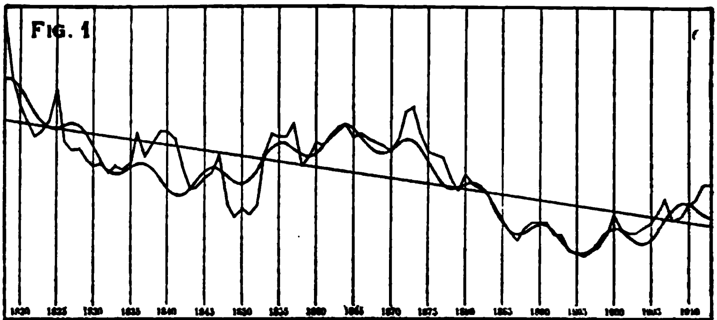
[1] Ibid., p. 525.

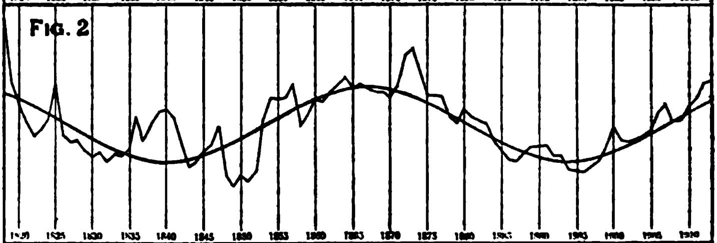
When the Fourier theorem is applied to such a series of ordinates as is provided by Sauerbeck's index numbers, a period of practically any number of years will yield a sinusoid of some amplitude, greater or less. This is shown in all of Professor Moore's periodogram tables. But do any of these sine curves represent a real periodicity in nature? Professor Moore himself raises this question. On page 505 he says: "When the parameters of this equation [$y = A_0 + A_1 \sin(kt + e_1) + A_2 \sin(2kt + e_2) + \ldots$] are determined from statistical data the question arises as to the significance of the several terms of the Fourier series. Do the successive terms in the sine series correspond to real periodicities in nature, or are they merely formal terms the summation of which will give the observed values of the original data?"[2] In answer to this question he accepts Professor Schuster's conclusion which, in brief, is that "the probability of the reality of an assumed cycle is . . . dependent upon the relative size of A^2 where A is the coefficient of the sine term descriptive of the assumed cycle." Since A is the amplitude of the cycle, this means that the probability that a cycle is based upon a real periodicity in nature increases in proportion to the squares of the relative amplitudes of the cycles. This may be accepted, but it should be remembered that it is only a probability, not a demonstrated fact. I shall presently show that the amplitude may be very considerable in a case where it is practically certain that no periodicity in nature exists, and in the case before us of Sauerbeck's index numbers I shall show that it is doubtful whether a certain cycle of considerable amplitude represents a real periodicity. The fit of a Fourier cycle becomes convincing only when the reasoning proceeds in the opposite direction. Let some periodicity in nature, such as sun spots or the conjunctions of Venus, be firmly established by independent reasoning, and let some causal relation based upon known physical principles be shown to exist between these phenomena and the phenomena under investigation, then an identity of Fourier cycles of large amplitude becomes strong corroborative evidence of the correctness of our reasoning. Having established the rainfall cycle we may proceed to crop yield and business cycles. This, indeed, in the main is the method pursued by Professor Moore, except that he does not discuss the alleged cosmic cause, conjunctions of the planet Venus, until all of the other derived cycles have received attention.

---

[2] Quarterly Journal of Economics, August, 1921, p. 505.

To discover, so far as could be discovered by merely investigating for amplitude, the probability that the Sauerbeck index numbers represented real periodicities in nature, I availed myself to a considerable extent of the advantages which a graphical method affords of suggesting conclusions to the eye, afterwards checking these conclusions by a mathematical analysis. I plotted the crude data as shown in Figure 1. A general downward trend is clearly discernible for the whole period from 1818 to 1913. To investigate for cycles it seemed desirable to eliminate this trend. I accordingly fitted a straight line to the crude data by the method of least squares and then referred the price curve to this trend as an axis of abscissas as shown in Figure 2. Inspection of the diagram now makes it apparent that the whole period covers approximately two major cycles of prices. Beginning at the extreme left there is a general downward movement of prices for about a fourth of the distance, then a general upward movement to the center, then downward and then upward to the extreme right. To discover the period of this cycle which would best fit the crude data I correlated by Pearson's formula $\left(r = \frac{\Sigma(xy)}{n\sigma_1\sigma_2}\right)$ each term of the series with its fiftieth, then with its fifty-first, then with its fifty-second, and so on. I found the coefficient of correlation highest when I correlated each term with its fifty-fourth, the coefficients





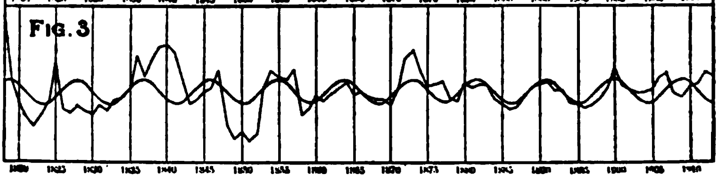


FIGURE 1. Graph of crude data of Sauerbeck's index numbers, 1818–1913, with trend [$y = 106.5 - 0.3784t$] and fifty-four and nine year cycles superposed thereon [$y = 106.5 - 0.3784t + 12.429 \sin(122° 51' + \frac{360}{54}t) + 4.143 \sin.(55° 53' + \frac{360}{9}t)$].

FIGURE 2. Sauerbeck's index numbers plotted to trend as an axis of abscissas and fitted with fifty-four year cycle, [$y = 100 + 12.429 \sin(122° 51' + \frac{360}{54}t)$].

FIGURE 3. Sauerbeck's index numbers plotted to fifty-four year cycle as an axis of abscissas and fitted with nine year cycle, $y = 101.3 - 4.143 \sin(55° 53' + \frac{360}{9}t)$.

decreasing as the interval of separation between the terms correlated was greater or less than fifty-four. At fifty-four the result was $r = 0.5725$. This led me to believe that the first major cycle of best fit was one with a period of fifty-four years. I accordingly computed by Fourier's formula its equation ($y = 100 + 12.429 \sin (122° 51' + 6° 40' t)$) and plotted it with the result shown in Figure 2. Again referring the data to this sinusoid as an axis of abscissas, the original data assumed the form shown in Figure 3. Inspection now led me to suspect a cycle of about nine years for a considerable portion of the period, tho it was clear that at the beginning a longer cycle of some nineteen or twenty years would make a better fit and at the end a cycle of shorter period — about seven years. I tried correlating by Pearson's formula each term with its seventh, its eighth, its ninth, its tenth, and its eleventh. The ninth gave the highest correlation, tho even in this case the result was negative ($r = -0.1102$). As it was larger than any of the others, however, I tried fitting a nine-year cycle to the crude data and obtained the equation $y = 101.3 + 4.143 \sin (55° 53' + 40° t)$. The curve was then plotted with the result shown in Figure 3. Now it will be observed that beginning about 1845 and continuing to about 1903 the nine-year cycle follows the ups and downs of the crude data with clinging fidelity. For the first twenty-seven years, however, and at the end of the curve the fit is poor. Indeed, there may be said to be no fit at all. Yet the Fourier formula for the whole period developed a cycle of very considerable amplitude (4.143), a value considerably larger even than that obtained by an erroneous method which Professor Moore accepted as indicating a real cycle of eight years (3.45) and nearly three times as large as that which he shows in his table on page 525 to be the true amplitude of the eight-year cycle ($\sqrt{2.12} = 1.45$). If the squares of these amplitudes are compared (and it will be remembered that it is the squares which Professor Schuster regards as significant) the evidence in favor of the nine-year cycle is even more pronounced. Nine-year cycle, 17.164; eight-year cycle (erroneous method), 11.902; (correct method), 2.12.

Yet in spite of the large amplitude of the nine-year cycle I am skeptical as to its indicating any real periodicity in nature. Had the price data been collected only from 1845 to 1903, the evidence of a real periodicity (so far as a Fourier cycle can give such evidence) would have seemed conclusive. The large amplitude, the perfect fit, would have left little to be desired. Yet with the whole period before us the case is otherwise and serves to show how misleading may be the method even when applied to crude data for so long a period as fifty-eight years — over six complete cycles. With the whole ninety-five years before us, we see that the nine-year cycle bears no resemblance to the data for the first twenty-seven years nor for the last nine years. A true periodicity in nature should not fail so utterly to manifest itself through so great a part of the ninety-five years as thirty-six — more than a third of the entire period. During the first part of the curve it is apparent that a cycle of about nineteen years would make a fair fit. It will be noticed that in the table on page 525 the value of A^2 for the period of 19.2 years has the high value of 28.23. The truth appears to be that when we have a considerable series of years, as in the case of Sauerbeck's index numbers, if a cycle shows a good fit throughout a portion of the period, it may, when computed by the Fourier formula, show a large amplitude even tho the fit throughout the remainder of the curve is very poor. I am inclined to think that the method of testing by correlations is somewhat more sensitive. As stated above, when applying the method of correlation, and using as subject and relative numbers in the series separated by an interval of nine years, the coefficient of correlation for the whole ninety-five years of the Sauerbeck table was negative, $r = -0.1102$. When applied to the first twenty-seven and the last eighteen years, the results were even more strikingly negative, $r = -0.4425$ and $r = -0.5046$ respectively. But when applied to the fifty years following the first twenty-seven, the period wherein the fit is obviously so good, the correlation was strongly positive, $r = +0.7001$.[3]

---

[3] It must be admitted that the evidence for a real periodicity in nature for the nine-year cycle from 1845 to 1903 is very strong. The large value of r (0.7001), the

To show that in the case of a series of crude data so chosen as to preclude the possibility of a true periodicity in nature, the Fourier analysis may yet seem to indicate such a periodicity, the following experiment was tried. A die was thrown fifty times and the number of pips on the face falling uppermost was plotted after each throw. To preclude any juggling for results the first fifty throws were taken. The curve was fitted to a straight line trend by the method of least squares, and then to cycles of five years, as shown in Figures 4 and 5.

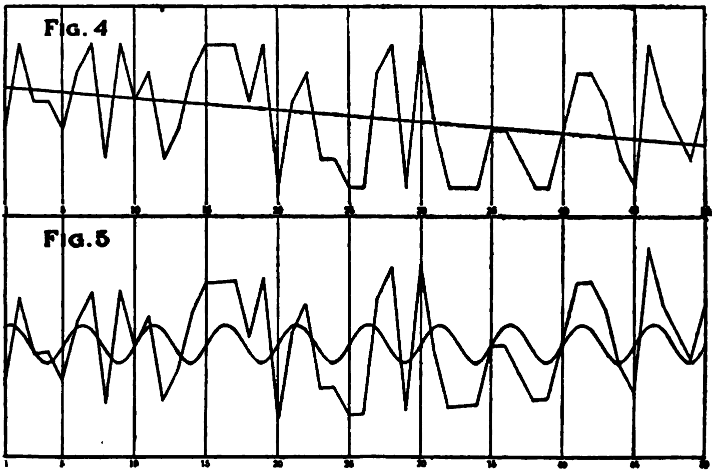


FIGURE 4. Graph of fifty throws with a die and trend, $y = 4.46 - 0.03913t$.

FIGURE 5. Graph of fifty throws with a die plotted to trend as an axis of abscissas and fitted with five year cycle, $y = 10 + 0.66 \sin (60^\circ 21' + \frac{360}{5}t)$.

The double amplitude of the cycle as compared with the extreme range of the crude data was very nearly as great as in the case of the nine-year price cycle just discussed. Die-

small value of the probable error (0.0486), and the observed close fit of the curve to the crude data indicate a relation so close as almost to preclude accident. If as suggested in the closing paragraph business and price cycles are due to cyclical recurrences in mass psychology reacting through capitalistic production, it appears as tho during this period of nearly sixty years the psychologic sequence ran its course in nine years. The diagram suggests to the eye a tendency for the cycle gradually to shorten. Previous to 1845 the period is longer than nine years and after 1900, less than nine years. The amplitude also tends to grow less. At any rate the diagram is sufficiently suggestive to call for a more detailed study than can be given to it in the compass of a review.

It may be noted that in the case of general prices in the United States (1870-1910) the nine-year cycle showed the best fit. See Quarterly Journal of Economics, May, 1915, pp. 635-637.

throw cycle, 22 per cent; price cycle, 25 per cent. At no part of the curve is the fit so good as that of the nine-year cycle from 1845 to 1903 in the case of the Sauerbeck index numbers. It is, however, about as suggestive of a true periodicity in nature as the eight-year cycles for rainfall shown on page 13 of the November issue of the *Quarterly Journal of Economics.*

As was stated above Professor Moore adduces certain quotations in support of his theory from the work of Professor A. E. Douglass on tree rings. But these quotations leave an entirely erroneous impression of Professor Douglass' work. It is true that he does find evidences of minor cycles of about eight years (not of precisely eight years, however) but such cycles are not deemed of sufficient importance by him to be even mentioned in the final summary of his work. What Professor Douglass does find and what he makes prominent in his summary is the sun-spot cycle of 11.4 years. On page 85 he says:[4]

> We shall find that the sun spot cycle plays an important part in rainfall.

And in the final summary, these words:

> (7) Practically all the groups of trees investigated show the sun spot cycle or its multiples; the solar cycle becomes more certain and accurate as the area of homogeneous region increases or the time of a tree record extends further back; this suggests the possibility of determining the climatic and vegetational reactions to the solar cycle in different parts of the world.
>
> (8) A most suggestive correlation exists in the dates of maxima and minima found in tree-growth, rainfall, temperature, and solar phenomena. The prevalence of the solar cycle or its multiples, the greater accuracy as area or time are extended, and this correlation in dates, point toward a physical connection between solar activity and terrestrial weather.

In my former review of Professor Moore's work and methods I used these words:

> The suggestion is offered that before any cycles relating to rainfall can be regarded as conclusive, some adequate astronomical or meteorological cause should be adduced.[5]

---

[4] Climatic Cycles and Tree Growth, A. E. Douglass.

[5] Quarterly Journal of Economics, May, 1915, p. 638.

The necessity of demonstrating some such basis in the physical universe is made more apparent by the test of the die throws given above. A cycle of fairly good fit was demonstrated for a period comparable to fifty years of rainfall. Yet the fall of a die is pure chance. It might, therefore, well happen that a cycle of large amplitude should adjust itself to the rainfall for a considerable number of years and yet the annual rainfall be dependent upon chance. Another selected period might show a cycle of very different amplitude and wave length, or no cycle at all. Such a situation is clearly suggested in the analysis of Sauerbeck's index numbers. The nine-year cycle made a remarkably good fit for fifty years, but no fit at all before or thereafter. The law governing price index numbers from year to year may, so far as the diagram proves anything, be the law of chance.

If, however, a recurring sequence of an astronomical character can be demonstrated and a causal relation between it and terrestrial phenomena shown to exist, the case is much strengthened. It is a merit of the 11.4-year cycle for rainfall that it correlates with the sun-spot cycle generally accepted by astronomers. The observed effect upon terrestrial magnetic and electrical phenomena suggests that there is a causal relation in some directions but the matter cannot yet be said to have been cleared up.

Professor Moore has recognized the need of an astronomical basis. In his contribution to the November issue of the *Quarterly Journal of Economics* he proposes such a basis for the rainfall cycle in the conjunctions of Venus. He explains at some length the motions of the planet relatively to the earth, and lays stress upon the peculiar climate of Venus, due to the fact that its axial rotation synchronizes with its orbital period of revolution, as having a possible effect upon terrestrial rainfall. In seeking an astronomical cause he is on the right track, but before the Venus theory can be taken seriously, it is incumbent upon him to explain in much more detail the process by which either the conjunctions or the meteorological conditions of Venus can affect the earth. The earth's meteorological phenomena are undoubtedly effects of solar energy, but even at a true conjunction at a time of transit the body of the planet appears as merely a small black spot against the sun's disk. Frequently a single sun spot exceeds it in size. The last transit occurred on December 6, 1882, and there will not be another until January 8, 2004. At ordinary conjunctions the rays of solar energy passing through the planet's atmosphere miss the earth by many thousand miles. The rays that do strike the earth do not pass through the planet's atmosphere and it is difficult to see how they could be in any way affected by conditions therein. The planet must exert a gravitational influence upon the earth, deflecting it from its normal orbit slightly towards the sun at a time of conjunction. It is conceivable that this deflection would slightly increase the quantity of solar energy received and hence the rainfall. Still, it is unlikely that the effect from this cause would be appreciable. On the whole it would seem that if Venus exerts any appreciable influence upon the earth's climate, such influence must be ascribed to astrological rather than astronomical causation.

In conclusion, it appears to the writer, that while it is always a fascinating pursuit to seek a physical basis for economic and sociological phenomena, in the present instance it is not necessary, in order to account for the roughly periodic ups and downs of business, to assign any such non-economic generating cycle. Adequate causal forces may be found in the capitalist system with its production in anticipation of demand, its constant influx of labor-saving machinery, and its foundation upon a basis so non-material and so subject to the swift mutation of group psychology as credit. Indeed, the rough periodicity of business cycles suggests the elastic recurrence of human functioning rather than the mathematical precision of cosmic phenomena.

PHILIP GREEN WRIGHT.

U. S. TARIFF COMMISSION
WASHINGTON, D. C.

THE AMERICAN RAILROAD PROBLEM: A REPLY

The avowed and manifest purpose of *The American Railroad Problem* was to present a comprehensive analysis of the economics of railroad transportation in the United States from the standpoint of public policy. The inclusion of the sub-title "A Study in War and Reconstruction" discloses the further fact that special emphasis was to be placed upon recent developments in railroad operation and regulation. In view of these circumstances, it was found necessary, in the first place, to present the outstanding facts of this recent experience — particularly to indicate, analyze, and interpret the "problems, policies, activities, and results which emerged in the war administration of the railroads" — and to describe and discuss the new legislation over which this war experience exerted a large influence. In the second place, it was deemed essential, on the constructive side, to go beyond the mere discussion of rates and financial adjustments, and to include a consideration of public as against private management in the railroad industry, multiple corporate ownership and operation as against a policy of deliberate unification, the positive goal of achieving an adequate and efficient transportation system as against the mere negative removal of "outrageous" abuses in rates and service, the maintenance of continuity in the railroad service through the recognition of labor relationships in the normal regulative process as against chaotic and ineffective adjustment of labor controversies through temporary extra-regulative agencies. On this basis an attempt was made to discover the interdependence between the various capital issues raised, and to present the whole as a unified public problem.

While it is not the object of this note to discuss standards of scientific criticism, it is perhaps worthy of at least passing notice that Professor Brown's review[1] appears to have little regard for the scope and purpose of the book. A twelve-page review is devoted to less than that number of pages out of a volume approaching five hundred pages in length. The intimate relationship between the various elements of the so-called railroad problem seems to have been entirely ignored, the reviewer being content to deal with a few questions of "rate reasonableness and rate regulation." The monopolistic character of the railroad industry and the demands of public policy in the formulation of regulative principles seem to have had a negligible influence upon the reviewer's analysis, the critic appearing to rely almost exclusively upon such reasoning as is primarily applicable under competitive circumstances in private industry. The realities of the railroad situation seem to possess no vital bearing upon the American railroad problem — not even the facts of the war period, with reference to operation and regulation and legislative development, facts and circumstances of so extraordinary a character and dealing with a period so recent that the sifting of evidence and interpretation of events would appear to be indispensable to "a study of war and reconstruction" in the railroad industry, even to an economist who is deeply imbued with the necessity of studying "fundamental principles" and who generally spurns the "easy by-paths" of factual, descriptive, and historical teaching and writing. There is, of course, the grudging concession that "often there is" a place for inductive reasoning in the study of principles. "But," it is immediately averred, "studies of occurrences and policies in their chronological order, coupled with commentary and discussion, do not constitute inductive investigation as the expression is understood in physical science." This dictum, in the opinion of the reviewer, apparently renders largely irrelevant the material dealing with the war-time administration of the railroads, with the analysis of the historic basis of the various railroad problems, with the background and character of the new legislative principles and machinery for the regulation of the carriers. There is no characteristic methodology, apparently, for the study of social as distinct from physical science. The facts of social science are assumed to be as simple and as objective as those of natural science. The complexities of economic relationships (as applied to functioning groups and classes rather than to the mere production "factors" of economic theory), the influence of the prevailing social psychology, the obstacles of the dominant political philosophy, the currents of opinion in which these social facts find expression, all seemingly make no contribution to the economist's formulation of the demands of public policy. History and experience, according to this conception, are things apart; they neither help to explain present difficulties, nor do they provide a basis for the solution of future maladjustments. The economist is a repository of a natural and absolute truth, even in matters involving public problems and practical adjustments, which may be deduced through abstract reasoning, if sufficiently incisive and refined, in complete detachment from the embarrassing forces of social living. Has not this very detachment from the social realities, tangible and intangible, rather than any flagrant unsoundness in fundamental analysis of principles, contributed most to the frequently-lamented sterility of the efforts of economists to mold the direction of public policy in large matters of vital public concern?

---

[1] Quarterly Journal of Economics, vol. xxxvi, No. 2 (February, 1922), pp. 323–334.

But the writer was constrained to present this note, not by way of defense of his book against the general judgment of the reviewer, but primarily because of the fundamental issues raised by him with reference to "the author's underlying philosophy regarding the basis of rate reasonableness." Professor Brown's conclusion is stated as follows: "It is in his study of rate standards and rate regulation that, the reviewer believes, Professor Sharfman has most signally failed in the adequacy and convincingness of his analysis. Indeed, the reviewer believes the solution offered to be fundamentally unsound." The unsoundness of the solution, in his opinion, rests on two grounds: first, he believes the proposal that, for the future, actual cost be accepted as the standard of valuation of railroad property for rate-making purposes to be unsatisfactory and mischievous; and second, he considers the proposal for the solution of the so-called strong and weak road problem, through the recapture by the government of part of the excess earnings of the more prosperous roads and through the adoption of a policy of consolidation, to be equally undesirable and mistaken.

With regard to the first of these problems, he states that "the issue is clearly joined . . . between cost of production and cost of reproduction as the basis of valuation for the purpose of rate regulation." Professor Brown's rejection of the actual cost basis and his support of the cost of reproduction method is almost entirely limited, in this discussion, to the question of land values. He contends that "so far as the unearned increment of land value is concerned, society cannot lightly deny it to the railroads while permitting it in all other lines of business." It might be a sufficient reply to this contention that there is fully as much reason for denying to the railroads the speculative return that arises out of the unearned increment in land as there is for denying them all other elements of speculative profit. The railroads are public service industries, beneficiaries of special legal privileges, engaged in the performance of an indispensable function, and operated, in the long run, under conditions of virtual monopoly. The very adoption of a system of rate regulation and profit limitation involves the recognition that railroads must be differentiated, from the standpoint of social control, from ordinary industrial undertakings. Competitive reasoning is as inapplicable to the railroad industry in the matter of land values as it is in the entire range of rates, service, capitalization, labor relationships, etc., which have brought the body of principles and machinery of our regulative system into existence. To the reviewer there may be sufficiently convincing reasons for believing that it may be a desirable policy "to tax this increment (the unearned increment) heavily wherever it occurs, to tax it altogether out of existence, even to tax land values in general at so high a rate as to appropriate all economic rent for public purposes." But to insist, in connection with the specific problem of railroad rate regulation, that unless the "single tax" program or a general extension of "special land-value taxation" is approved, it is unsound to advocate the denial of the unearned increment in land values to corporations engaged in the performance of a public service, appears to suggest an absence rather than a mere suppression of logic.

What, concretely, are the objections offered to "doing away with the unearned increment of railway land while allowing owners of land used in all other ways to enjoy such an increment?" First, it is claimed that such a policy would operate to prevent railroad-building. If prospective builders of railroad lines know that they cannot enjoy the gains to be derived from the unearned increment in land values which they would be permitted to receive in connection with other uses of such land, "they will prefer some other use or uses." There appears to be an assumption here that the owners of land are themselves necessarily the builders or owners of the future railroad property, and hence exercise a deliberate choice between alternative uses. There seems to be a complete failure to recognize that common carriers may exercise the sovereign right of eminent domain. There is a clear implication that the possibility of return through the unearned increment on the land itself, as a separate element, is the determining factor in influencing the direction of capital commitments, rather than the adequacy of the financial return on the investment as a whole. The principles governing valuation for purposes of condemnation are confused with those governing valuation for rate-making purposes. The denial of the unearned increment in the latter case, after the land has been acquired by the carrier and has become railroad property, does not prevent or invalidate the purchase of land by a railroad company "at a price as high as would probably have to be paid for it by persons intending to use it otherwise."

And while such a price would doubtless be "higher in a growing country than the present income would justify, because of the anticipation of future gains," the actual cost standard of valuation for rate-making purposes would prevent further additions to the value of the land, in the course of its life as railroad property, because of the mere growth of the community or because of any other circumstances that are entirely extraneous to the performance of the transportation function.

In the second place, the writer's assertion that the acceptance of the actual investment basis, as distinct from reproduction cost, need not necessarily result in an illiberal rate of policy is construed by the reviewer to involve the necessity of allowing "higher current earnings" under all conditions, in order "to compensate the railroads for not permitting them to enjoy the to-be-expected increased value of their land, when such enjoyment is permitted in all other lines of business." On the basis of this construction, he expresses alarm lest transportation charges be highest in the early history of a railroad, when the community which it serves is least able to bear them, and lest, in case of "a declining community and a decreasing value of land," the public be made to bear transportation charges that are not only unnecessarily burdensome but impossible of application. The fears of the reviewer arise out of an erroneous construction of the demands of the situation. Railroad rates must be so adjusted as to maintain the credit of the carriers, so that capital may be attracted into the industry for necessary improvements and extensions; but merely because, as stated by the writer, "the needs of the transportation service and the exigencies of the credit situation must always be taken into account in the adjustment of the level of transportation charges," an obligation does not necessarily arise, therefore, to recognize specifically such speculative increments as are involved in the appreciation of land values. There need be no guaranty that railroad rates will yield an adequate return, from the beginning, on an "excessive" actual cost, nor that such a return will always be maintained, regardless of the ability of the community to bear the charges essential to produce it. Transportation agencies are not economically advantageous from the public standpoint unless the service which they render is of sufficient importance to the community to enable them to pay their way. Under any circumstances, there is neither need nor obligation to provide compensation for "the to-be-expected increased value of their land." Competition for capital by other enterprises would be met by adjusting the rate of return, in direct response to the capital needs of the railroad industry and the conditions of the money market, and not by inflating the valuation base for reasons wholly independent of the performance of the transportation service. Under a system of private ownership of railroads, the rewards to capital must be sufficiently liberal to maintain the industry in competition with alternative demands for industrial investment, the relative stability of income and risk of loss being taken into account; but investors in railroad securities are concerned with the income yield of their capital commitments, and not with the speculative gains arising out of land ownership. And in a public service industry like railroad transportation; the recognition by public authority of such speculative claims for their own sake constitutes a subversion of the function of the state to provide, directly or indirectly, modern highway facilities.

But the relative merits of actual cost and cost of reproduction as standards of valuation for rate-making purposes are not confined to differences in treatment of appreciation of land values. The value of railroad property, under each of these methods, is also affected by changing unit prices of labor and materials embodied in railroad plant and equipment, and by the degree of recognition accorded to intangibles. The writer's contention that, for the future, "actual cost of the property used in the transportation service, or actual investment committed to railroad enterprise, when honestly and prudently made, constitutes the natural basis for the computation of the fair rate of return to which those engaged in the operation of a public service industry are reasonably entitled" is applicable to land valuation only as one element of the valuation process; and the cost of reproduction method must likewise be extended to the entire complex of railroad plant, materials, and rights, whether tangible or intangible, which constitute railroad property. The logical application of the cost of reproduction standard may be made to involve, for example, a recognition of going concern value and franchise value and the use of "multipliers" in land valuation. Representatives of the carriers have not hesitated to submit such claims, and to present "convincing" arguments in support of them, in spite of the fact that their acceptance would enmesh the courts in the realm of mere conjecture and speculation, and would, in its practical outcome, lead to a virtual abdication by public authority of its powers of effective regulation. As new elements of value are pressed into recognition under the cost of reproduction standard, there is a gradual absorption of all earnings resulting from any prevailing level of rates, whether reasonable or unreasonable, and an inevitable approach toward "charging what the traffic will bear" in its absolute and monopolistic connotation.

It is important to keep constantly in mind that the nature of the valuation process in any given case is dependent fundamentally upon the purpose for which the result is to be utilized. The value of railroad property for purposes of rate-making, whether ascertained on the actual cost or the reproduction cost basis, does not correspond to the economist's "exchange value" or price in the market. Such a value would render all efforts at regulation futile. The earnings of a road cannot be used as the chief factor in determining the base by which the reasonableness of these earnings is to be tested. Courts and commissions merely seek to arrive at a figure which, in view of the purpose of the valuation, will most nearly reflect the demands of public policy in recognizing the equitable claims of the owners of the property and of the users of the service. In pursuit of this purpose, the "fair value" concept emerged. Both the recognition of this concept, and the cost of reproduction method which has been given primary consideration in its development, are largely the creation of legal reasoning, and not of economic analysis. The failure of our legislatures to define specific standards by which the reasonableness of rates is to be tested led to the judicial enunciation of the "fair value" concept; the traditional preoccupation of our courts with private property rights, and the dominantly individualistic temper of the common law, led to an overemphasis of competitive considerations in an industry naturally monopolistic.

The avowed basis of the cost of reproduction theory, as presented by its advocates, is a competitive basis. In supporting this theory for railroad valuation Professor Brown says: "However high may have been the necessary cost of a plant in a given competitive business, prices of the goods produced cannot be kept high if new concerns can construct equivalent plants at low cost. And on the other hand, however low the amount which concerns already in such a business had to pay for necessary real estate and equipment, if the cost to new entrants is high, these new concerns will not come in unless they expect to be able to charge prices commensurate with the present cost of plant." In the first place, such reasoning would normally support cost of replacement as a basis of valuation rather than cost of reproduction — that is, the cost of producing a plant capable of rendering an equivalent service, rather than the cost of reproducing the identical units of the existing plant. These two valuations do not necessarily come to the same result. Both single roads and railroad systems as they exist today are the outcome of long periods of growth and development. On a strictly competitive basis, there is no reason for saddling upon the public in perpetuity the burdens of unsound judgment or mistaken experimentation in the location or construction or equipment of the line. The cost of replacement, however, involves highly conjectural estimates based upon widely speculative judgments, and regulating authorities shrink from entering upon so uncharted a field. But essentially, if in lesser degree, the cost of reproduction method involves a similar surrender to mere speculation. It assumes a complete extinction of the railroad property under valuation, without any corresponding modification of the external circumstances and conditions (as to land values, prosperity of the community, price levels, etc.) for which the existence of the railroad line may have been in large part responsible. It has been said with much truth that the "reproduction theory contemplates an imaginary community in which an imaginary corporation makes imaginary estimates of the cost of an imaginary railroad," and that it involves "the estimates of engineers as to what it will cost to buy land that will never be bought again, to duplicate property that will never have to be duplicated, and to build up a business that will never again have to be developed."[2]

Fundamentally, the pernicious defect of the reasoning that supports the cost of reproduction theory arises from a confusion between competitive conditions and conditions of monopoly — from an attempt to think monopoly and competition at the same time. The railroads are allowed to enjoy the status of monopoly, and at the same time are assumed to be subject to the normal exigencies of competitive pressure. There is a failure to recognize the moral certainty not only that the existing plant will never be reproduced as such, but that no such plant will ever be created in competition with the existing plant. To think and argue in competitive terms (whether the conclusion leads to cost of replacement or to cost of reproduction as the valuation base) is to run counter to the realities of the situation. By all standards of sound economic analysis, railroads are admittedly natural monopolies; and they are largely monopolistic in fact, in spite of the many legal obstacles that have in the past been designed to retard this natural tendency to monopoly. Under the recent legislation there is a decided *rapprochment* between the economic demands of the situation and the legal status of the railroad industry: cooperative efforts are legalized, extensions and abandonments are made subject to public approval, consolidation into large systems is recognized as desirable and actively encouraged, and the construction of new lines is made to depend upon governmental authorization grounded in public convenience and necessity. For the future, then, under conditions that are dominantly monopolistic, actual cost constitutes the natural valuation standard for purposes of rate-making. If the price of the transportation service under a system of public regulation, in order to achieve as nearly as possible the result attained in private industry through competition, should normally approach cost of production, then the capital cost of the service that constitutes one element of such cost of production is much more truly reflected by actual cost than by reproduction cost as a basis of valuation; for railroad systems are developed rather than created outright, and hence no *momentary* capital cost, such as is attained through the reproduction cost method, corresponds to the capital cost which may legitimately be included, even by imputation, in the cost of the service. The actual cost theory, on the other hand, accepts the effective sacrifice of the investor, over a period of time which corresponds to the duration of the physical upbuilding of the plant, as the basis for the computation of the fair rate of return; and this rate of return, under a system of private ownership, can and should be so adjusted as to afford such incentive as is necessary to stimulate efficiency of management, and such an income yield as will maintain the credit of the carriers as affected by the capital needs of the transportation service and the general movements of the money market for fixed investments.

---

[2] E. W. Bemis, in the Proceedings of the National Association of Railway Commissioners, 1913.

In the light of the foregoing differences of outlook and policy, and in view of limitations of space, it is unnecessary to undertake a detailed discussion of the second of the two problems raised by the reviewer — the question of recapturing excess earnings and of encouraging railroad consolidations. These policies, which, in their essence, have been incorporated in the Transportation Act of 1920 and have been recognized by most thoughtful students of the railroad problem as constituting constructive advances in the field of public control, are challenged by Professor Brown, partly because he fails to give due recognition to the equity of the public in the railroad industry, and partly because he envisages the American railroad net as a rigid organization consisting of a large number of distinct railroad corporations rather than as a single transportation system. Neither in purpose nor in probable effect does the excess earnings proposal involve the subsidizing of less favored regions by more favored ones. Insofar as differing advantages are equalized under our transportation system, the situation is an outcome of the rate structure — of the disregard of distance in the adjustment of the relativity of rates — rather than of the adjustment of the general level of charges. The excess earnings provisions do not contemplate the artificial support of weak roads that are not needed, nor the increase of rates for those of them that *are* needed above a reasonably remunerative level. On the contrary, their purpose is to divert part of the surplus earnings of the strong roads — surplus earnings that arise out of a rate level that is deemed fair and reasonable for the ordinary lines. If the level of charges were so adjusted as to yield a reasonable, and not more than a reasonable, return to the strong roads, the country would be deprived of the necessary service of the weaker lines; the alternative policy is to allow a reasonable return for the roads as a whole, or in naturally delimited rate groups, and to recognize the equity of the public in the surplus earnings that emerge in case of the stronger roads. These roads are entitled to a fair return on their investment, which fair return, for the protection of the service, must be sufficiently liberal to stimulate efficient management and maintain railroad credit; but the earnings in excess of such a fair return should be equitably vested in the public, if the regulative process is to be effective and monopolistic exploitation is to be averted. In summary form, the argument has been stated as follows: "Federal authority to regulate railroad rates is unquestioned and plenary, and its duty does not extend beyond allowing a fair return on the accepted value of the railroad property; but competitive rates must necessarily be uniform, and such uniformity inevitably leads to excess earnings for some of the carriers; the public, therefore, is equitably entitled to such earnings as exceed a fair return, and it is desirable that the public claim be made effective; the recapture of excess earnings, then, and their devotion to the public use in the transportation service, is but a device appropriate to the attainment of a socially desirable end."[3] It is to be noted, moreover, that this process does not involve a diversion of "some of the large returns of prosperous roads into a subsidy for weaker roads." The policy as advocated, and as incorporated in the new legislation, contemplates the creation of a reserve, out of the excess earnings recaptured by the government, for the extension of loans to carriers and for the purchase and lease of equipment — in other words, for the support of the transportation service as a whole. In like manner, the policy of deliberately encouraging railroad consolidation (or, better, compelling such consolidation) finds its source in the need of welding our many railroad lines into a coördinated transportation system. Primarily, the motive for unification is to secure greater operating efficiency — to bring about a fuller and more flexible utilization of plant and equipment, through the subordination of corporate advantage to common transportation needs; but a plan of orderly consolidation is bound to combine some of the weaker roads with the stronger lines, to lessen, if not eliminate entirely, the startling contrasts in earnings between prosperous and poor roads that are inevitable under a system of multiple corporate ownership, and hence, in the course of time, to render less important the question of the emergence and disposition of excess earnings. Unless the essentially public character of the transportation function is clearly recognized in these financial adjustments, and unless the goal of achieving an

[3] The American Railroad Problem, p. 309.

adequate transportation *system* (as distinct from the chaotic conditions of the past) is measurably realized, there is little likelihood that the regulative method can withstand the pressure for out and out nationalization of the American railroads.

I. LEO SHARFMAN.

UNIVERSITY OF MICHIGAN.

SOME EFFECTS ON CERTAIN AGRICULTURAL PRODUCTS OF UNIFORM PERCENTAGE INCREASES IN FREIGHT RATES

THE policy of the Interstate Commerce Commission concerning post-war freight rate advances apparently has been to grant equal percentage increases for all commodities. This policy seems to have been adopted because of the resulting uniformity of change; the practice of charging "what the traffic would bear," which the railroads commonly adhered to in former years, has been discarded for the sake of this uniformity. No account seems to have been taken of the varying ability of different industries to meet the increased charges. In point of fact, however, if the "uniformity" desired is the maintenance of the existing price equilibrium between commodities and between localities then the change in rates must be proportioned to the relative part which freight charges play in total supply costs. The purpose of the present paper is merely to illustrate the truth of the above statement. The claim is not necessarily made that the existing equilibrium should be maintained; but this question may fairly be asked: "may not changes in freight rates be so made as to minimize their disturbance of other industries?" Admittedly there is no "normal" relationship between the prices of different commodities; factors affecting both supply and demand change so rapidly that the market is in a constant state of flux. Such a condition is essential in a dynamic society. Nevertheless, any stabilizing of the effect of those factors which are incidental to production (such as freight charges) will tend to allow the success of the individual productive industry to depend upon its own efficiency and value to society.

During the period of rapid advancement in the scale both of wages and prices it was obviously proper that freight rates should be increased over those in force prior to 1914. An advance of 25 per cent in June, 1918 was accepted by the public in general as an adjustment clearly in keeping with conditions. On the other hand, when a second advance of 35 per cent over the 1918 rate was announced for August, 1920 conditions had changed; prices paid to farmers were declining, wages had ceased to rise, interest rates were lowering, wholesale prices were breaking in almost all lines. These disturbing factors affected different industries in varying degree and therefore the flat percentage increase in freight rates was harder for some industries to bear than it was for others.

Freight advances that are based on equal percentage increases cannot result in the same distribution of the freight burden as existed before the change, and for at least two reasons, namely:

First, different industries are always affected to varying degrees by the conditions that have led up to the change in freight rates. For this reason, altho the original rate may have been based on an equitable distribution of the burden, the increased rate may be exhorbitant in some instances. Most agricultural products fell in price more rapidly during 1919–20 than did other commodities and a correspondingly heavy load was, therefore, placed upon them by the freight advance of August, 1920. This is a matter, however, of constantly shifting ground; if it were considered in the adjustment of freight rates it might lead to endless changes of schedule.

Second, freight charges represent different proportions of the total cost of various commodities. Obviously, any change in freight rates will more noticeably affect supply prices in the case of products where freight is a large element of cost than where it is a small item.

It is with this second point that the present paper will deal. Two agricultural products that are shipped east from California in large quantities will be used for the purpose of comparison, namely, citrus fruits (oranges and lemons)[1] and dried beans. Freight charges represented nearly 35 per cent of the delivered value of citrus fruits as against 15 per cent in the case of beans, on the basis of the 1914 freight rate.

A few figures will serve to summarize the two industries and to show the relative importance of freight in each case.

	Beans	Citrus
California acreage harvested	590,000 acres (1918)	150,000 acres (1921)
Investment per acre	$200.00	$1100.00[1]
Yield per acre[2]	1200 lbs.	200 packed boxes
Farm value of crop	4.00 cents per lb.[3]	$2.00 per box f.o.b.[4]
Freight charge prior to 1918	.75 " " "	1.05 " "
Delivered value — farm value plus freight	4.75 " " "	3.05 " "
Ratio of freight to delivered value .	15.8	34.4

1. "Net cost of bringing a citrus grove into bearing in 1916." Quoted from R. S. Vaile in Report of the Commission on Land Colonisation and Rural Credits in California. November 29, 1916, pp. 30–32.

2. T. F. Hunt, University of California, College of Agriculture, Circular 121, p. 3. A table is shown giving (*a*) average yields, (*b*) safe estimate for business purposes, (*c*) good yield which competent men may hope to attain, (*d*) yield not infrequently obtained under favorable conditions. The figures used here are found under (*b*).

3. Five-year average value 1911–15 as reported by the U. S. D. A. Each annual figure is the unweighted average of the prices on the 15th of each month.

4. Approximate five-year price received by the California Fruit Grower's Exchange 1911–15 for from 60 per cent to 70 per cent of the total California crop.

The two freight rate changes of 1918 and 1920 totaled 71 per cent of the original rate. This, in effect, increased the delivered cost of each commodity, but in varying degree. In the case of beans the percentage increase for the same supply amounted to 11.2 per cent of the former delivered value, while with citrus fruits it was 24.4 per cent. The actual increases became one-half cent a pound for beans and 75 cents a box for citrus fruits.

---

[1] Citrus fruits are used in this study rather than either oranges or lemons separately for two reasons. In the first place published statistics frequently refer to them together, and, in the second place, weather conditions play so large a part in the lemon market as to partially mask the effect of changing freight rates. If lemon figures were used alone, without reference to weather conditions, certain conclusions as to the elasticity of demand might be modified, but the present writer believes that the data would then be misleading. The question of elasticity of supply and demand will be referred to again later.

It is evident from the above figures that the supply cost of citrus fruits was affected to a greater extent than was that of beans by the readjustment of freight rates. This lack of uniformity has been most strikingly illustrated by the president of the California Fruit Grower's Exchange[2] in a comparison of the increased charge per acre of crop. On this basis, the bean crop had to pay $6.40 per acre more for freight than formerly, while the citrus industry paid an additional $149 per acre to the railroads. It is pointed out that $149 capitalized at 6 per cent gives a sum of nearly $2500, or over twice the cost of developing bearing orchards five years ago. In the case of beans a 6 per cent capitalization of the freight increase amounts to just over one-half the present value of the land.

The cost of an acre of citrus orchard so greatly exceeds that of an acre of bean land that a fairer comparison may be made on the basis of freight charged for each $100 capital invested in the farm.

FREIGHT ON PRODUCT FROM EACH $100.00 CAPITAL INVESTED

	Beans	Citrus
Rate prior to June, 1918	$4.50	$19.10
Increases of June, 1918 and August, 1920	3.20	13.55

From the above figures it is seen that if the producer pays the freight the citrus grower must carry 4¼ times the increased cost in proportion to his capital invested as compared with the bean grower. The 3.2 per cent on investment, absorbed by the increased freight in the case of beans, would take nearly all the return on capital which any agricultural enterprise can hope to average; the 13.5 per cent on investment taken by the increased freight on citrus is more than any agricultural product can stand without an offsetting increase in consumer's price. Obviously, if the grower had to pay the full increase the margin for profitable groves would be greatly raised and the supply of oranges and lemons from California correspondingly reduced. It may be pointed out again that if the freight charge is entirely passed on to the consumer the wholesale price of citrus fruits would have to increase 24.4 per cent, while that of beans would be raised only 11.2 per cent. A uniform increase in freight rates is thus seen to be entirely lacking in uniformity of effect on the two commodities.

---

[2] C. C. Teague, "Relation of Freight Rates to California's Fruit Production," California Citrograph, vol. vi, No. 10, p. 342.

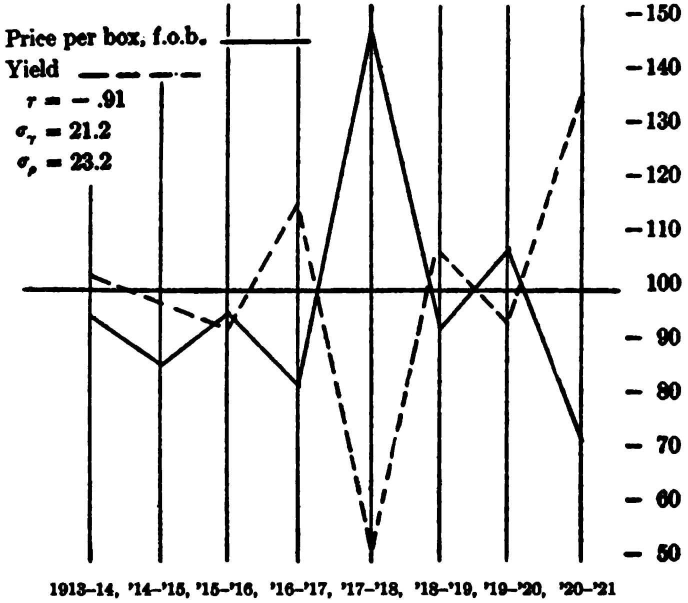
The degree of elasticity in the supply of and demand for California products will largely determine the effect of the unequal changes in freight burden upon the two crops considered. The whole question of opportunity or substitution costs is involved, both from the standpoint of the consumer and the producer. The returns to the producer will remain constant only if all sources of supply are affected alike by the change in freight and if, at the same time, the demand is sufficiently inelastic so that the entire increase in supply cost can be added to the market price without reducing the volume of sales. It would be extremely rare, however, for all sources of supply to be affected to the same extent by a flat percentage increase in freight rates. For instance, California citrus fruits are in competition with similar fruit from Florida. Because of the shorter haul and water competition the original freight rate from Florida was less than from California and constituted a smaller proportion of delivered costs. Applying the argument already developed in the comparison of beans with citrus, a uniform percentage increase in freight rates from California and from Florida must have influenced the supply price of California fruit more than of Florida fruit. If the two competing districts were in equilibrium before the advance in rates then Florida was given an advantage by the change. The same difference exists between beans grown in California and those produced in Michigan or New York. Partly as a result of this shifting of balance in supply costs as between different sources of supply, imports of foreign lemons increased during 1920.

The demand for any particular agricultural product is usually quite inelastic. This has been markedly the case with California oranges for whenever the yield has been heavy the price has been low. The relative yields and prices during the past eight years show a high inverse correlation, as illustrated in the accompanying graph.

This behavior strongly suggests that any attempt to raise orange prices to cover the increased freight charges would lead the consumer to substitute locally grown apples or something else for oranges. The farm price of beans, on the other hand, seems to have been positively correlated with the California yield during the past eight seasons ($r = +.56$); that is, a larger supply was consumed when prices were high than when they were low. This, however, is undoubtedly due to the stimulation of war conditions and should not be taken to mean that the increased freight rate will be paid by the

RELATIVE YIELDS AND PRICES OF CALIFORNIA CITRUS FRUITS

Percentage deviations from an eight-year average, 1913–14 to 1920–21.



consumer without a reduction in consumption. In fact the 1921 delivered price was the lowest since 1915.

From another point of view the increase in freight becomes a disturbing element in supply costs only when it is greater, relatively, than the other elements of cost. That is, if the cost of freight for each $100 of invested capital increases in the same proportion as the field costs or the harvesting and selling charges, then any reduction in profits[3] to the producer may as properly be charged to high wages or whatnot as to freight. If the total supply cost increases in the same proportion in California as in Florida it can make no difference in the California-Florida competition whether freight is a large or a small element in the cost.

A brief analysis of the production and market situations in regard to California citrus fruit is of interest in its bearing on the affect of the recent freight advances. In the present study the past eight years have been included, commencing September 1, 1913 and closing August 31, 1921. This gives nearly five full years before the first freight increase and one full year while the double increase was in force. The data have all been arranged on the basis of the cost, or value, of the product for each $100 capital invested in bearing groves.[4] For the present purpose the dollar seems a more satisfactory unit of land measurement than the physical acre. The following table gives the delivered price of the fruit produced on each $100 worth of land. This figure is then resolved into its component elements of costs and returns on capital.

A consideration of the above figures shows that the citrus industry shared in the general war and post-war boom of 1917–20 and that a reaction set in during the 1920–21 season. This is in keeping with almost all lines of business

---

[3] "Profit" is used here and elsewhere in this note to mean the total return on capital.

[4] The value of bearing groves has been kept constantly at $1100 per acre. During the brief period of high prices some average groves sold at higher figures, and the cost of bringing a grove into bearing may be more now than it was five years ago. In general, however, $1100 is not far from the average value. This must not be confused with the price of good or exceptional groves, which occasionally sell for three or even four times this amount.

DELIVERED PRICE AND COST OF PRODUCTION OF CITRUS FRUITS PRODUCED FROM EACH $100 WORTH OF LAND
1913-14 TO 1920-21. YEAR SEPT.-AUG.

Year	Delivered price	Cost of freight	Cost to harvest and sell	Field costs	Net return on $100 capital
1913–14	$33.85	$12.70	$7.30	$13.20	$1.65
14–15	33.50	12.00	6.60	13.35	1.55
15–16	39.08	11.20	7.70	14.00	6.18
16–17	46.70	14.00	10.90	14.35	7.45
17–18	36.50	7.45	6.20	15.45	7.40
5-year ave.	38.12	11.47	7.70	14.10	4.85
1918–19	58.50	16.70	12.70	17.80	11.30
19–20	62.10	15.50	13.90	19.70	13.00
20–21	74.50	25.90	17.90	22.70	8.00

RELATIVE MOVEMENTS OF COSTS AND PROFIT DURING THE PERIOD OF INCREASING FREIGHT RATES

Year	Cost of freight	Field costs	Net return on $100 capital
5-year ave. 1913–14 to 1917–18	100	100	100
1918–19	146	126	232
19–20	135	136	269
20–21	226	161	161

and is beside the point in the present problem. The significant fact is the change in cost of freight compared with the change in other elements of cost. The field costs, over which the farmer has direct control, were only 61 per cent greater in 1921 than for the five-year base period (1913–14 to 1917–18), while freight charges were increased 126 per cent; that is to say, freight charges had increased more than twice as much as field costs. Such a disproportionate increase in freight costs must have resulted in an advantage to Florida shippers as against Calirofnia shippers for, as already pointed out, freight is a more important element in the supply price of California fruit.

On the other hand the delivered price which was actually paid also increased more than the farmers' field costs, and just as much as the total cost of delivered fruit. Consequently the net returns on capital in 1920–21 bore the same relationship to the five-year average as did field costs. It may be noted, however, that the profit for 1920–21 was only $8 for each $100 worth of orchard as against an average of $9.16 for the five years 1915–16 to 1919–20. But as already suggested this reduction in earnings may be accounted for by the general post-war slump; also the 1920–21 crop was the largest ever produced in California and its profitableness was therefore affected by the inelasticity of demand. Apparently for this one season the consumer absorbed the entire freight increase and left the producer in the same position as that held during the five-year average before the first change in freight rate.

It does not necessarily follow, however, because for one year the consumer pays the bill without forcing a reduction in consumption, that flat percentage increases in freight rates are justified. The fact remains that the supply cost of citrus fruits has been affected over twice as much by freight rate changes as has the supply price of beans. If the producer does not suffer thereby then the consumer of oranges and lemons is put at a disadvantage in comparison with the consumer of beans. While the supply of California citrus fruits is less elastic than is the case with annual crops yet the increase of the industry may be materially curtailed by a freight advance that affects California producers to a greater extent than Florida and foreign producers. Citrus fruit is high-grade freight and presumably the traffic in it is profitable for the railroads. From the standpoint of railroad policy that rate should be charged which would yield the largest product of volume of business times profit per unit. It is probable that the pre-war rate, which had been thoroly tested, was very close to this ideal point, and that the arbitrary overthrow of balance between crops and between localities will result unfavorably to the carriers. It is certainly true that several hundred acres of marginal citrus groves have been abandoned in California as a result not so much of *high* freight rates as of the new equilibrium between supply costs which the flat percentage increase in rates necessitated.

The conclusion seems evident. If "uniform" freight rate changes are intended to maintain the existing equilibrium between commodities and localities then the "uniformity" must be proportioned to the relative part which freight charges play in total supply costs. Otherwise the relative costs of commodities will be shifted with every change in freight rate and the equilibrium of supply and demand will constantly need to be reëstablished.

ROLAND VAILE.

UNIVERSITY OF CALIFORNIA.

BOOKS RECEIVED

Amalgamated Clothing Workers. The Clothing Workers of Chicago. Chicago: Amalgamated Clothing Workers of America. 1922. pp. 424. (Prepared under the direction of Leo Wolman and others.)

Birck, L. V. The Theory of Marginal Value. New York: E. P. Dutton & Co. 1922. pp. 351. $6.00.

Bonnett, Clarence E. Employers' Associations in the United States. New York: Macmillan. 1922. pp. 594. $4.00.

Brewer, Daniel Chauncey. The Peril of the Republic. New York: G. P. Putnam's Sons. 1922. pp. 354. $1.75.

Broderick, John T. Pulling Together. Schenectady, N. Y.: Robson & Adee. 1922. pp. 141. $1.00.

Edie, Lionel D. Principles of the New Economics. New York: Thomas Y. Crowell Co. 1922. pp. 525. $2.75.

Epstein, Abraham. Facing Old Age. New York: Alfred A. Knopf. 1922. pp. 352. $3.50.

Furniss, Edgar S. Foreign Exchange. Boston: Houghton Mifflin Co. 1922. pp. 409. $2.50.

Golovin, General N., in collaboration with Bubnov, Admiral A. D. The Problem of the Pacific in the Twentieth Century. London: Gyldendal. 1922. pp. 256. 10*s.* 6*d.* (Translated by C. Nabokoff.)

Hall, Ray Ovid. The Chinese National Banks. Washington, D. C.: Agents, Ballantyne & Sons. 1922. pp. 291. $2.50.

Hansen, Alvin Harvey. Cycles of Prosperity and Depression in the United States, Great Britain, and Germany. Madison: University of Wisconsin. 1921. pp.112. $1.00.

Henderson, H. D. Supply and Demand. New York: Harcourt, Brace & Co. 1922. pp. 181. (The Cambridge Economic Handbooks, J. M. Keynes, Gen. Editor.)

Jenks, Jeremiah W., and Lauck, W. Jett. The Immigration Problem. New York: Funk & Wagnalls Co. 1922. pp. 655. $3.00. (5th edition, revised and enlarged by Rufus D. Smith.)

Jennings, Walter Wilson. The American Embargo, 1807–1809. Iowa City: University of Iowa. 1921. pp. 242. $1.50. (University of Iowa Studies.)

Lauck, W. Jett and Watts, Claude S. The Industrial Code. New York: Funk & Wagnalls Co. 1922. pp. 571. $4.00

Lavington, F. The Trade Cycle. London: P. S. King & Son, Ltd. 1922. pp. 113. 3*s.* 6*d.*

Learned, William S. and Sills, Kenneth C. M. Education in the Maritime Provinces of Canada. New York: Carnegie Foundation for the Advancement of Teaching. 1922. pp. 50. (Bulletin No. 16.)

MacGarr, Llewellyn. The Rural Community. New York: Macmillan. 1922. pp. 239.

Magee, James Dysart. Introduction to Economic Problems. New York: Scribner's Sons. 1922. pp. 363.

Mahindra, K. C. Indian Currency and Exchange. Triplicane, Madras, S. E.: S. Ganessu. 1922. pp. 250. Rs. 3–8.

Morris, G. W. and Wood, L. S. The Golden Fleece. Oxford: Clarendon Press. 1922. pp. 224.

Mueller, Henry R. The Whig Party in Pennsylvania. New York: Longmans, Green & Co. 1922. pp. 271. $2.75. (Columbia University Studies.)

National Industrial Conference Board. Changes in the Cost of Living, July, 1914–March, 1922. New York: Century Co. 1922. pp. 33. 75 cents. (Research Report No. 49.)

——. The Cost of Living Among Wage Earners. Anthracite Region of Pennsylvania, February, 1922. New York: Century Co. 1922 pp. 41. 75 cents. (Special Report No. 21.)

——. Experience with Works Councils in the United States. New York: Century Co. 1922. pp. 191. $2.00. (Research Report No. 50.)

——. The International Organisation of the League of Nations. New York: Century Co. 1922. pp. 159. $2.00. (Research Report No. 48.)

——. Wages and Hours in Anthracite Mining. June, 1914–October, 1921, inclusive. New York: Century Co. 1922. pp. 67. $1.50. (Research Report No. 47.)

Odate, Gyoju. Japan's Financial Relations with the United States. New York: Longmans, Green & Co. 1922. pp. 136. (Columbia University Studies.)

Pantaleoni, M. Bolcevismo italiano. Bari, Italy: Guis, Laterza & Figli. 1922. pp. 276. L. 13, 50.

Preziosi, Giovanni. Coöperativismo Rosso Piovra Dello Stato. Bari, Italy. Gius, Laterza & Figli. 1922. pp. 322. L. 3, 50.

Rew, Sir Henry. The Story of the Agricultural Club. London: P. S. King & Son. 1922. pp. 205. 10*s*. 6*d*.

Robertson, D. H. Money. New York: Harcourt, Brace & Co. 1922. pp. 182. (The Cambridge Economic Handbook, J. M. Keynes, Gen. Editor.)

St. Lewiński, Jan. The Founders of Political Economy. London: P. S. King & Son. 1922. pp. 173. 6*s*. 6*d*.

Schelle, G. Oeuvres de Turgot et Documents le Concernant. Paris: Félix Alcan. 1922. pp. 722. (Tome IV.)

Schlesinger, Arthur Meier. New Viewpoints in American History. New York: Macmillan. 1922. pp. 299.

Spencer, William H. Law and Business (Vol. III). Chicago: University of Chicago Press. 1922. pp. 653. $4.50.

Stamp, Sir Josiah. Wealth and Taxable Capacity. London: P. S. King & Son. 1922. pp. 195. 10*s*. 6*d*.

Stockder, Archibald H. Business Ownership Organization. New York: Henry Holt & Co. 1922. pp. 612.

Tipper, Harry. Human Factors in Industry. New York: Ronald Press. 1922. pp. 280. $2.00.